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ABSTRACT

Scenarios depicting both positive and negative alternative futures were prepared to serve as a source of ideas in this study of ways to achieve better schools for less money. Included are (1) a disaster scenario based on piecemeal, reactive solutions; (2) a scenario based on applications of "big media"; (3) a scenario based on individualized instruction using "little media"; (4) a "history" of technology failures in education; and (5) a "success" scenario based on rational problem solving and the design processes of educational technology. Scenario preparation led to the identification of questions which should be addressed: Can schooling be made efficient and effective without an assessment of goals? Can education be improved if it is viewed as a teaching process? How can we determine whether schooling is as effective as it should be? Is it possible to bring about change in the schools? Parameters which can be varied to alter educational costs were also identified. This is the second in a series of three reports; the first provides a review of the literature on the costs and effectiveness of educational technology, and the third presents five scenarios on cost reduction in higher education. (Author/RAO)

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K-12

Educational Technology and Basic Education in Florida:

Scenarios for Five Alternative Futures

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Systems
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PREFACE

The contents of this report are intended for individuals who are interested in maintaining the viability of education in Florida and ensuring its future effectiveness and success. In the most general terms, our target audiences would include policy makers, decision makers, practitioners, and anyone else who has a direct stake in the operation of our public schools. In more specific terms, policy makers would include state legislators, Department of Education personnel, school board members, and school superintendents--all of whom will be faced with the difficult task of making ends meet as our schools move through each annual financial cycle.

Another important audience is made up of advocates for learners and their schools--whether they be professional lobbyists or concerned parents. May they find the cost analyses and alternative solution possibilities a source of ideas for mounting influence campaigns to make our schools a good place for children to grow and develop in. And lest we forget, there are the teachers and educational administrators who make learning happen on a day-to-day basis. May each of these audiences find ideas that will stimulate and increase the effectiveness of their problem solving efforts as we move into a clouded and stormy future.

A Gloomy Financial Future for Education

The financing of education in Florida over the next ten years appears to be uncertain. If present cost trends continue, public education would require 86% of Florida's General Revenue Fund (GRF) by 1985 if no new sources of tax revenue are found; education's present share of general revenue funds is presently approximately 60% (1).* The 1977 Florida legislature took a conservative approach toward raising taxes to provide additional state revenue. Although some new taxes were approved, they will produce less revenue than the amount required in the governor's budget request or that desired by educators in general. It seems clear that the public, through its elected representatives, is reluctant to dig much deeper to fund education at the level to which it has become accustomed during the previous two decades.

The problem of financing education is not isolated to Florida. For example, Robert McBride (2) reports an analysis of the national educational picture which is very similar to Florida's situation. He points out that the fraction of Gross National Product (GNP) allocated to education has doubled in the past 25 years and now comprises from 7.5% to 8% of the total. By 1980-81, McBride estimates that there will be a deficiency

*Numbers in parenthesis () refer to references which document sources of quotations and the validity of projections. A complete list of supporting documents can be found at the end of this preface.

of about \$15 billion dollars between revenues and educational expenditures at the national level. It seems clear that this gloomy financial picture is not the figment of some isolated economist's imagination. The data can be replicated at both local and national levels!

So the game of "hounds and hares" is on--expenditure requirements speed ahead steadily each year while the public very reluctantly generates just enough revenue to barely keep up minimum levels of service. But which is the "hound" and which is the "hare"? The only thing that seems clear is that both are becoming leaner and leaner as they race into an uncertain future.

Given the larger picture, questions can be raised as to whether or not economic growth can ever again generate enough resources to bring education funding to levels that we knew back in the "good old days" of the 1950's and 1960's. The 1977 Florida legislature's reluctance to increase taxes any more than it did may well be prophetic of the future over the next ten to twenty years. If it is, then educators will not be able to rely on increased funding to balance local school budgets which continue to rise through inflation, higher costs for energy, increases for teachers' salaries, as well as for increase in all other categories of expenditure. In addition, taxpayers are questioning whether they and their children are obtaining a fair return on their investment in education; completion of high school or college no longer guarantees access to an occupation of one's choice as jobs become harder and harder to find.

The present game of "hounds" and "hares" is unlikely to change in the near future. If present trends continue, the Florida legislature will continue to be reluctant to vote new taxes to pay for an ever expanding state budget. If this is true, then about the best we can expect is a modest tax increase only whenever it appears absolutely necessary. As a result, school districts will have to rely more and more on their own resources to overcome impending deficits or else make drastic cuts in expenditures to live within the means provided by state and local taxes and funds from federal sources. This is by way of saying that it looks as though there will be few, if any, ways to get out of the present financial bind through the hope of increased state funding. It seems more likely that schools will be expected to do as well, if not better, for less money. If this assumption is true, and there are projections to support it, what can school districts do to work through this financial bind and come out as stronger and even more viable educational institutions?

Purpose of This Report

In this report we will address the problem of providing better schools for less money. Some may scoff and conclude that such a prospect is not possible. Under present operating assumptions that may well be true. However, suppose that some of our most cherished operating assumptions--e.g., students must be taught by a "live" teacher, schools must be in session for 180 days each year--were changed? What would schools look like then? Would schooling cost less? And more importantly, would such schooling produce as much student learning as we think is desirable?

The purpose of this report, then, is to present alternative futures of what education in Florida might look like under different sets of assumptions and to describe what role educational technology might play in providing effective education at less cost. The means for exploring these alternative futures is through the technique of scenario writing.

Scenario writing is a tool which is being utilized more and more frequently by planners concerned with problems of the future. As Spitzer points out, scenario writing is a method for developing future thinking which attempts to unify the often discrete ideas and predictions generated by other methods such as brainstorming or the Delphi technique (3). Spitzer also strongly urges the institutionalization of future thinking for planning and decision making in the present. Thus, he sees scenario writing as a method of planning educational change which attempts to avoid haphazard solutions which often occur in reaction to salient external forces.

Although there is a great deal of fiction in scenario writing, the fiction is based on research and expert opinion. Lest the reader assume that we have let our imaginations run unbridled by reality and fact in creating the scenarios, we wish to point out that each author has researched each solution and solution strategy to estimate as closely as possible required levels of costs and expected levels of effectiveness. A list of references which documents projections can be found at the end of each scenario chapter.

Overview of Chapters in this Report

This report has been written to serve as a source of ideas. Readers are therefore encouraged to sample from the chapters rather than to begin on page 1 and read page-by-page to the end. A brief overview of each chapter is given below to assist you in familiarizing yourself with the content of this document so that you can make choices more closely related to your interests and to access information in an efficient manner.

Chapter 1 - Analysis of General Tax Revenues and Cost Increases for Education in Florida. This chapter presents a summary of costs for public education in Florida for 1965-66 and for 1974-75. It describes how much expenditures have increased (for the state as a whole) in each of nine cost categories. Summaries for total instructional costs for each of the 67 county school districts are also provided.

Expenditure and revenue projections are presented. If present cost trends continue without significant change, public education would require 86% of Florida's General Revenue Fund (GRF) by 1985 if no new sources of tax revenue are found. The nine cost categories are analyzed in terms of relative size to determine which ones have the greatest potential for cost reduction. Not surprisingly, the largest category turns out to be instructional costs at 58.2%. The next largest category is for capital outlay at 12.1%. The remaining cost categories range from 2.5% to 8.8%. It is concluded that the area with greatest cost reduction potential is instructional costs.

Chapter 2 - Drifting into 1985: A Scenario of a Possible Future for Public Education in Florida (K-12). This chapter contains a description of one possible future for the Florida K-12 School System. It is a disastrous future which could evolve if decision makers allow the system to drift along for the next eight years within its existing parameters, intervening only when situations reach crisis proportions, and by implementing poorly-planned, reactive solutions.

A number of intended solutions are described in terms of the background developments leading to their adoption, their cost reduction potential, and their effects on other social and economic systems in the state. The intended solutions portrayed in this scenario include: increased student/teacher ratios; program reduction; more efficient management systems; elimination of 12th grade; and elimination of building maintenance. The major effects of these intended solutions on other social and economic systems include: increases in school violence, vandalism, and juvenile delinquency; increased costs for litigation in areas such as negligence, breach of contract, and equal educational opportunity; school bankruptcies and closings; massive teacher strikes and walkouts; and decreasing effectiveness of schooling in terms of student achievement and preparation for independent survival.

Chapter 3 - Instructional Use of Television and Computers in Basic Education (K-12): A Supplement to the Report of the Commissioner of Education, A Scenario. This chapter explores what schools would be like if "big media" such as instructional television and computer-assisted instruction were adopted as means for reducing educational costs. It is based on the assumption that the traditional instructional system must be revamped to increase educational efficiency and effectiveness.

Preliminary cost estimates suggest that television and computers require high initial expenditures which are prohibitive unless large numbers of students can be served. Therefore, statewide instructional systems are adopted in order to achieve economies of scale. Creating a statewide system requires giving up a degree of local control in curriculum areas where instruction is to be delivered by "big media".

Cost categories for the "big media" are listed to show the complexity of implementing such systems as well as showing why there are such high initial costs for equipment acquisition and production of instructional software. Savings in instructional costs are achieved by replacing only 1400 of the approximately 6000 teachers who either retire or terminate employment for various other reasons. These savings are used to capitalize the high initial costs for hardware and software acquisition. By the fourth year, the initial "savings" generated to capitalize the new instructional system are no longer required for that purpose and become savings to the educational system thus providing the basis for significant cost reduction. The social costs involved include increased teacher/pupil ratios, loss of local control of curriculum, and a loss in curriculum diversity.

Chapter 4 - A Cost Reduction Plan: Flexible Learning Programs for the Elementary and Secondary Schools, A Scenario. Written in the form of a magazine article for Better Schools Magazine, this scenario describes how the use of "little media" (i.e., film strip projectors, audiotape recorders, programmed instruction, etc.) can be integrated with individualized instruction and differentiated staffing to increase learning effectiveness while decreasing costs. The cost reduction mechanisms on which this scenario is based include: increased class size and elimination of kindergarten and the 12th grade. New classroom configurations and pupil management procedures, learning resource centers, and differentiated use of personnel are among the means adopted in order to avoid the potential discipline and learning problems that could emerge by doubling teacher/pupil ratios.

This scenario also demonstrates the key role which "soft technology" (i.e., problem-solving and design processes) plays in selecting and coordinating the methods and means required to bring about better schools for less money. Shifting from a teaching- to a learning-outcome orientation is identified as a basic requirement for achieving a cost-effective educational system. The scenario closes with a series of interview conversations. These conversational "vignettes" describe what life is like under the new educational system and how it is viewed by the students, parents, and teachers who have experienced it.

Chapter 5 - A History of Instructional Technology and its Implications for Emerging Technological Applications in Education: A Scenario. The setting of this scenario is a visit to the World Exposition of 1990. The reader is taken on a vicarious visit to a series of exhibits sponsored by the International Society of Learning Facilitators. The exhibits are intended to portray the historical development of technological applications to instruction. The historical review begins with the first known instance, that of the written record as was done in ancient Greece. The exhibits go through time and describe noteworthy technological artifacts and their subsequent success or, more often, their ultimate failure.

The purpose of this chapter is to provide a brief review of the history in the area of instructional technology so that similar outcomes might be avoided in the future. Pitfalls that have been encountered by many promising instructional innovations are listed and discussed. The pitfalls include: (A) applications of instructional media have tended to emulate a book or a traditional teacher rather than capitalizing on the particular medium's inherent capabilities; (B) the impetus for programming powerful media such as film and television has been for commercial and artistic purposes rather than focused learning outcomes commonly found in school curricula; (C) emphasis on hardware development rather than software development has resulted in a lack of high quality learning materials; (D) hardware systems have lacked reliability of performance; (E) software has not been compatible from one system to another; (F) teachers have not been trained to use technological applications effectively; (G) technological applications have tended to be used as add-ons and therefore have increased rather than decreased costs.

Chapter 6 - A Brief History of the Transformation of Basic Education (K-12) in Florida, 1965-1985: A Scenario. This scenario is written as an historical account of the transformation of the Florida public schools. The impetus for the transformation came about because of reduced levels of public financial support and increased costs of education. The main theme of this scenario is that we can provide better schools for less money through application of systematic problem solving and carefully designed solutions.

The scenario begins with an analysis of educational and economic problems by a panel of experts. Re-examination of the goals of education was identified as the initial step in attempting to solve the problem of providing better schools for less money. An alpha type needs assessment was then performed in each school district to identify discrepancies between observed learner outcomes and desired learner outcomes. The observed discrepancies were then evaluated against criteria external to the school, namely: what is required of the learner to survive and contribute to his community after completing school? This resulted in eliminating several traditional subject areas and replacing them with more up-to-date, functional learning outcomes.

Once learner outcome gaps had been translated into curriculum goals, the next step was to determine solution requirements and then to identify and select solution alternatives to achieve the goals.

Educational costs were reduced by increasing class size and by eliminating the 12th grade. To reduce discipline problems and to increase achievement, emphasis was placed on helping students to maintain and to increase their interest in learning. This was accomplished by means of individualized learning contracts. The learning contracts, in turn, helped the students to acquire self-management and self-direction skills required for individualized, life-long learning. Other means used to manage learning were individualized instruction, learning centers based on "little media" such as film strip projectors, audiotape recorders, and programmed instruction, and differentiated staffing. Evaluation became an on-going function of each school program in order to determine whether or not the intended solutions were producing required results. Components of the system were revised whenever evaluation data indicated that desired learning results were not being obtained.

Inasmuch as schools lacked a sophisticated planning capability, the legislature provided one-time funding to create effective planning units at the local level. Systematic problem solving and planning capabilities are identified as essential requirements if Florida schools are to reduce costs while maintaining or increasing present levels of effectiveness.

Chapter 7 - Improving the K-12 Education Program in Florida: Some Questions Which Must be Asked. This chapter is not a scenario but an identification and discussion of critical questions which educators must ask themselves if they are to deal effectively with the impending financial crisis in education. Responding to these questions helps to identify underlying assumptions which we may not have considered but which have a significant impact on the way we perceive "reality".

The first question raised is: Do we really want the same results in education just delivered at lower costs? An affirmative answer to this question assumes that our goals and curriculum are satisfactory but our means for attaining them are either inefficient or ineffective, or both. The next question implicitly challenges an affirmative response to the previous question: Can schooling be made more efficient or effective without a reassessment of educational goals? The danger of offering an affirmative response to this question is identified by the next question: What is gained by being highly efficient in producing useless outcomes? Being efficient, therefore, also requires being effective. Other questions: Are we? And how do we know?

Another important set of issues revolves around being able to distinguish between means and ends. We traditionally think of education as being process-oriented; the means involved are instruction or teaching. This gives rise to the next question: Can schooling be improved if it is viewed primarily as a teaching process? Perhaps the process can be improved, but will such improvements in process have any relationship to improvements in learning outputs? We can't tell unless we also look at the outcomes.

One of the more difficult issues raised has to do with standards, namely: How can we determine whether or not schooling is as effective as it should be? Given the pluralistic nature of our society, whose standards should prevail? Or should there be multiple standards with each community setting its own? This is a question with which professionals who operate state-wide assessment systems must grapple--not to mention the legislators who passed the enabling legislation. And the most basic question of all: Is it possible to bring about significant change in the educational system? And finally, if we commit ourselves to deep change: What kinds of problems will be encountered while implementing the alternatives discussed in the preceding and other, scenarios? These are the questions which problem solvers and planners must ask and answer in consort with the other educational partners--the learners, the parents and community members, and the educators (i.e., implementers of the educational process).

Chapter 8 - Cost Reduction Parameters for K-12 Schooling. This chapter of the report presents and discusses the conceptual framework which was used to plan the various cost reduction strategies in Chapters 3, 4, and 6. The model is based on a straightforward assumption: The way to reduce costs is stop spending money. How much to stop spending should be established as a cost reduction goal at the outset. Given this initial constraint, the remainder of the cost reduction task is to design methods and means which manipulate cost related program parameters to achieve the desired cost reduction goal.

Program components which can yield cost reductions are identified and discussed. They include: number of personnel, number of students, and number of programs. Shifting from a labor intensive to a capital intensive mode of education is a factor in many of the alternatives discussed. Such a shift will require high initial outlays for equipment and facilities. How will these high initial costs be paid? Will the

capital intensive approaches be maintained over a long enough period of time with a sufficiently large number of students to achieve savings through economies of scale? As each of the parameters is manipulated in an effort to achieve the cost reduction goal, questions must also be asked regarding the educational effectiveness of proposed solutions. Will students learn at least as much under a proposed alternative? And finally, will students, parents and teachers accept the methods and means that have been selected?

Epilogue. Each of the preceding chapters has discussed aspects of the problem of achieving better schools for less money as well as exploring potential consequences of relying on piecemeal solutions. As the concluding section of this report, the epilogue summarizes what the authors believe to be the key points that must be addressed if we are to succeed in achieving better schools for less money.

The most critical issue is the requirement to reassess present curriculum goals and objectives. If this can be accomplished, then we must create incentives that will motivate educators to change present methods and means for increasing learner performance. One of the major barriers that must be confronted is to turn schools from being "budget-driven" to "learner-driven" organizations. A shift from "budget performance" to "learner performance" would set the stage for managing for results thereby establishing the basis for increasing effectiveness and efficiency.

The functions that educational technology should perform are considered and conditions for obtaining maximum benefits from educational technology are summarized. These conditions include: creating an effective planning capability (something which school districts presently lack); creating an effective management capability (something which schools must learn to do better); creating an effective means for monitoring the effectiveness and efficiency of instructional programs (something which we are only beginning to learn how to do); and shifting our ways of thinking and behaving from a focus on instructional processes to a focus on learning outcomes (i.e., adopting a learner performance orientation).

Careful distinctions are made between technology as a problem solving and design process and technology as hardware applications. The epilogue closes with the conclusion that the problem solving and design processes of educational technology provide a more useful means for achieving better schools than do technological applications in the form of hardware delivery systems.

Myths about Educational Technology

As mentioned earlier, one of the purposes of this report is to explore what roles educational technology could play in providing better schools for less money. A caveat is in order before proceeding further. It deals with misperceptions commonly held about the concept of educational technology.

The most common misperception is that educational technology should be equated with "things" such as computers and computer terminals, tele-

vision receivers and transmitters, radios, movie projectors, and all of the many other kinds of instructional media devices that the public has seen or read about. These "things", however, are only a small part of the larger, more generic, concept of educational technology. The larger and more significant part of the concept has to do with the problem solving and design processes that must precede the "things." Few if any technological applications--no matter how simple or complex--could be productive without prior activity devoted to identifying the purpose to be achieved and then designing both processes and "things" to achieve that purpose.

Moving back to an instructional context, the "things" of instructional media are little more than gadgets if there is no lesson to communicate. And the lessons to be "taught" must also be carefully designed and developed to achieve the purposes which should have been identified at the outset. In light of these relationships, we take great care to distinguish between the terms educational technology and technological application.

Educational technology, as we will use it, refers to:

- The identification of educational goals and objectives and the design of methods and means to achieve them.

We shall use the term technological application to refer to:

- The hardware and other means that are inserted into the educational process to achieve desired ends.

Thus, examples of technological applications (or hard technology) would include: instructional television; computers; moving picture projectors; tape recorders; programmed instruction; and other examples of instructional media.

Why all the fuss about the distinction between educational technology and technological applications? The most basic reason is that educational technology (or soft technology) as a problem solving and design process seems to hold a greater potential for achieving better schools for less money. Technological applications, on the other hand, may serve as a substitute for the human teacher; but we can find little or no evidence that such hardware substitutes can actually reduce costs in and of themselves (4). Therefore, if educational technology is equated with hardware applications, it gives us only a limited set of alternatives which may not even include the most effective ones for identifying the problems let alone solving them.

It has been a sobering experience to review the literature on the costs and effectiveness of technological applications. Our review (4) did not lead us to the panacea which "technology" has been alleged to be for increasing productivity in other sectors of the American economy. The failure to find a panacea may actually be a blessing in disguise. It has required us, and others, to probe more deeply in an effort to determine the underlying problems rather than continuing to work under the assumption that our schools are "OK" and all that is required is to discover the

"right" solution to make them more efficient.

Our Goal: To Reduce Costs while Maintaining Present Effectiveness

As you read each of the alternative futures which have been depicted, you may find some of the scenarios more appealing than others. On the other hand, you may find that none include the "happy ending" that you and others may wish for our schools. Still others may fault us for not portraying more "creative" applications of the latest developments in instructional media such as communications satellites and sophisticated combinations of instructional hardware such as multimedia carrels equipped with videodisc players, micro computers, and other exotic hardware being projected for the future. To such criticisms we can only say that we set out to reduce costs, not to increase them.

Come with us now to see what the future of education might look like in Florida within the next ten years.

REFERENCES

1. Florida Department of Education. Analysis of projected enrollments, expenditures, and revenues for public education in Florida 1974-75 through 1985-86. Author, July 1976.
2. McBride, R.H. Where will the money come from? Financing education through 1980-81. Phi Delta Kappan, 1976, 58(3), 248-49, 253.
3. Spitzer, D.R. Educational futurism: Problems and perspectives. NSPI Journal, 1976, 15 (8), pp. 8-9.
4. Stakenas, R.G., & Kaufman, R. Costs and effectiveness of technological applications in education: A literature review. Tallahassee: Florida Department of Education, January 1977. (STAR Project No. 76-2061)

Chapter 1

ANALYSIS OF GENERAL TAX REVENUES AND COST INCREASES FOR EDUCATION IN FLORIDA

by

Craig Hewitt

Introduction

The Florida education system is facing a financial dilemma. It has experienced rapidly increasing costs and now faces the prospect of constant or even declining state revenues. The purpose of this chapter, therefore, is to:

- Document this potentially dangerous financial situation
- Identify where costs and cost increases have been greatest
- Analyze educational expenditures to identify those categories which show the greatest potential for cost reduction

By looking at costs for the past ten years and how they have increased, we may be able to say something about future costs and how expanding expenditures can be cut or minimized.

It is estimated that Florida's population will grow on the average of 2.75% per year between 1976 and 1985 (see Figure 1). School enrollment for K-12 is predicted to grow at a somewhat lower rate of 1.8% (1).^{*} In the last ten year period, school enrollment grew at an average rate of 2.45% per year. For the same period total educational expenditures have increased 253%. If enrollment continues to increase and educational costs rise at the historical rate, there will be a financial crisis. This will occur because, even though state population is increasing, state revenues are expected to rise less than proportionally.

The bleak revenue situation is blamed on Florida's "outmoded" tax structure. In constant 1976 dollars there is an anticipated 6.3% decline in total revenues over the next ten years. Looking at the past growth rate of costs, the Department of Education has forecast a 2.5% increase in costs per year in constant 1976 dollars (see Figure 2). If allocations to education remain either constant, or remain a fixed percent of the general revenue fund, the educational system will be asked to handle a possibly larger number of students with a constant or declining amount of money. This divergence will ultimately lead to a financial crisis.

^{*}Numbers in parenthesis () refer to references which document sources of quotations and the validity of projections. A complete list of supporting documents can be found at the end of this chapter.

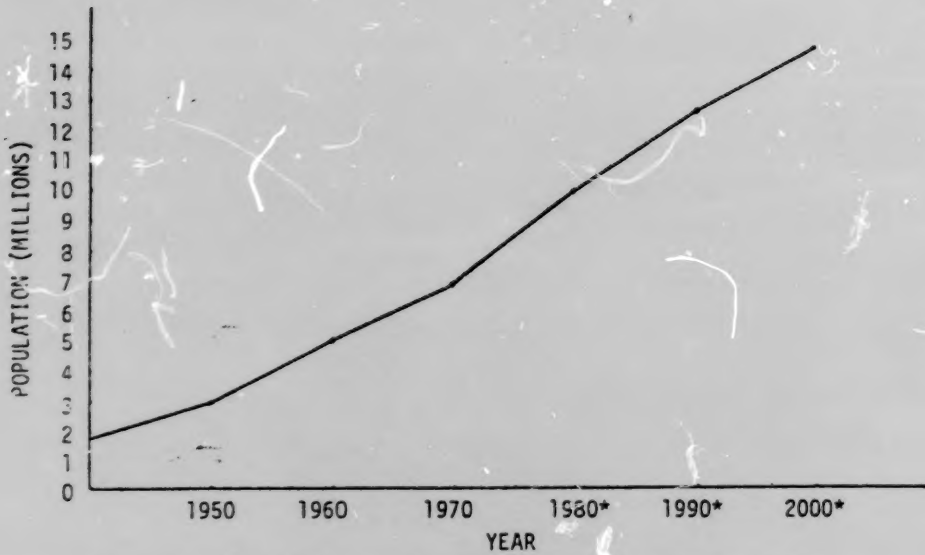


Figure 1. Population growth in Florida from 1950 to 2000.
(Source: 1976 Economic Report of the Governor)

*Based on population forecasts

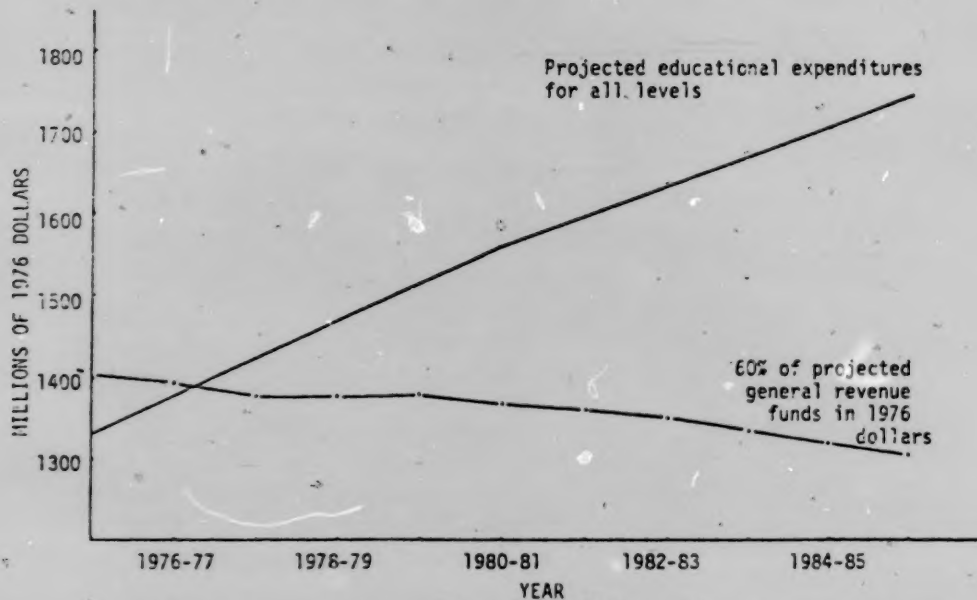


Figure 2. Projected educational expenditures for all levels contrasted with 60% of projected general revenue funds from 1975-76 to 1985-86.
(Source: Florida Department of Education)

Components of Expenditures

In fiscal year 1974-75, the state general revenue fund was approximately \$2.3 billion. Education expenditures were 60.8% of the fund or \$1.425 billion and \$826 million came from other sources. Public schools, K-12, were allocated 70.6% of total educational expenditures; community colleges, 9.9%; the state university system, 17.9%; and other, 1.6%. About 1,545,300 students were enrolled in the public schools; 494,945 were in community colleges; and in the State University System (SUS) 107,731. Since public schools are responsible for the largest percentage of money and students, this report will concentrate on grades K-12.

Breaking down expenditures for K-12 gives \$1.31 billion or 58% of the total going for instructional costs. Teachers' salaries were 68.6% of instructional costs or \$898,781,339. A complete list of instructional costs is as follows:

I. Salaries

- Salaries of consultants and supervisors
- Salaries of principals
- Salaries of teachers
- Salaries of other instructional staff
- Salaries of vocational and adult education personnel
- Non-MFP instructional salaries
- Salaries of secretarial and clerical assistants

II. Nonsalary Expenditures

- Free textbooks
- Audio-visual supplies
- Periodicals and newspapers
- Other library expenses
- Teaching supplies
- Other expenses for education
- Contracted services

After instructional costs the next largest expenditure group is capital outlay at \$272,824,292 or 12% of the total. Capital outlay includes expenditures for sites; new buildings and additions; remodeling; original, replacement or additional equipment for pupil transportation; food service and for other; library books; and nonconsumable audio-visual materials. The third category is auxiliary services at \$198,068,514.17 or 8.8%. Auxiliary services include pupil transportation services, food services, attendance services and health services. Operation of plant is the fourth largest category at \$142,931,797 or 6.3% of total expenditures. Fixed charges are fifth at 4.2% or \$93,632,085, and include insurance and judgments, rental of land and buildings, commissions and election expenses. Debt service is a close sixth at \$92,617,500 or 4.1%. The seventh category is administration expenses at 3.5% or \$77,953,976. This category includes legal services, the salaries of school board members, superintendents and their expenses. To recapitulate, the categories of educational expenditure and their associated percentage of the budget are as follows (in descending order):

1. Instructional Costs	(58.2%)
2. Capital Outlay	(12.1%)
3. Auxiliary Services	(8.8%)
4. Operation of Plant	(6.3%)
5. Fixed Charges	(4.2%)
6. Debt Service	(4.1%)
7. Administration Expenses	(3.5%)
8. Maintenance of Plant	(2.5%)
9. Non-Program Schools	(0.3%)

To give a comparison with the 1974-75 expenditures the same categories of data are used from 1965-66, a ten year span.

For the school year 1965-66 total expenditures for education were \$637,248,420. In Table 1, the various categories of expenditures are presented as a percentage of the total budget for comparison. Capital outlay and debt service percentages declined by 1.1% and 2.1% respectively. The largest gain in relative position was in auxiliary services of 5.2% followed by gains of 2.8% in fixed charges, 1.6% in administration, 0.6% in operation of plant and 0.1% in maintenance expenditures. Auxiliary services went from fifth to third in the ten year period while debt service dropped from third to fifth.

TABLE 1

EXPENDITURE CATEGORIES AS A PERCENTAGE OF TOTAL EXPENDITURES

	<u>1965-66</u>	<u>1974-75</u>
1. Instructional Costs	65.5%	58.2%
1a. (Teachers' Salaries)	(47.7)	(39.9)
2. Capital Outlay	13.2	12.1
3. Auxiliary Services	3.6	8.8
4. Operation of Plant	5.7	6.3
5. Fixed Charges	1.4	4.2
6. Debt Service	6.2	4.1
7. Administration	1.9	3.5
8. Maintenance of Plant	2.4	2.5
	<u>99.9%</u>	<u>99.0%</u>

Instructional Costs by County

Table 2 provides a county-by-county comparison of instructional costs for 1965-66. The first column of data shows the total number of students per district. The second column has the total instructional cost per district. Dade County was high at \$85,607,436 and Lafayette County was low at \$255,336. In the third column is the number of teachers per district. In the fourth column, total teachers' salaries are broken out of Instructional Costs. The fifth column is the instructional cost per student in each district. In 1965-66 Dade County was high at \$393.30 per student and rural Okeechobee County was low at \$227.24 per student. Out of the five highest counties three are mainly high population districts and two low population districts. At the other extreme, the five counties with the lowest instructional costs per student are all low population or rural counties. The sixth column shows the average instructional costs per school.

There is a high correlation between the average teacher salary paid within a district and the average instructional cost per student as would be expected since teacher salaries are about 50% of instructional costs. The range of the average teacher salary was \$4,931.13 in Union County to \$7,220.79 in Pinellas County.

Table 3 gives the same categories as Table 2 for the 1974-75 school year. Within the State of Florida instructional costs range from rural Lafayette County's \$488,364 and 839 students, to urban Dade County's \$231,777,361 and 268,991 students. Mean instructional cost is \$43,303,881 and the mean number of students is 23,899. Most counties spend less than \$10 million on instructional costs. Of the 67 counties, 21 spend between \$10 million and \$100 million and 2 spend more than \$100 million. The average teacher's salary varies from a low of \$7,657.99 per year in Dixie County to a high of \$13,621.08 in Broward County. Generally, the higher the average teacher's salary in a district the higher the total instructional costs and the higher the average cost per pupil. Two exceptions are Columbia and Jackson Counties. These counties pay an average teacher salary of over \$10,000 per year, and have an average pupil-teacher ratio of about 20 to 1, and an average instructional cost per student of less than \$700. The average instructional cost per student is lowest in Lafayette County at \$582.08 per student but the highest is Jefferson County at \$954.36. Both of these are rural but of the highest five counties, three are rural and two are counties with large urban areas. The bottom five are all rural counties. The rural counties have small populations and low enrollments. Rural counties also generally have a lower cost of living which is reflected in teachers' salaries as well as other educational costs such as capital outlays for land and buildings. But this is not consistently seen in total or instructional cost. The most obvious reason that average costs are not consistent from one region to another or between rural or urban counties is the amount of local control and local funding. The individual district can increase local funding through property taxes if it wishes to spend more per student. State funds were disbursed according to average daily attendance so that the average per student funding in each district in the state should be equal, differing only

TABLE 2

COUNTY-BY-COUNTY COMPARISON OF K-12 INSTRUCTIONAL COSTS IN FLORIDA FOR 1965-66

COUNTY	NUMBER OF STUDENTS	INSTRUCTIONAL COSTS(IC)	NUMBER OF TEACHERS	TOTAL INSTRUCTIONAL SALARIES	AVERAGE IC/STUDENT	AVERAGE IC/SCHOOL
1. Alachua	22,254	\$ 6,321,145.46	863	\$ 5,048,415	\$284.05	\$197,536.78
2. Baker	2,341	679,711.85	96	566,451	290.35	97,101.71
3. Bay	17,977	4,560,780.80	684	3,575,400	253.70	157,268.31
4. Bradford	3,436	1,184,066.17	161	869,984	307.87	148,008.25
5. Brevard	56,888	16,199,696.82	2142	13,046,713	284.76	294,539.94
6. Broward	93,059	29,277,528.56	3427	23,806,004	314.08	289,381.47
7. Calhoun	2,246	820,566.26	95	538,092	365.35	164,113.20
8. Charlotte	3,200	1,172,512.01	138	893,662	366.41	167,501.71
9. Citrus	3,196	951,088.80	130	781,992	297.59	105,676.55
10. Clay	6,897	1,785,855.14	244	1,383,728	258.93	127,561.07
11. Collier	6,574	2,103,220.11	256	1,658,261	319.93	161,786.15
12. Columbia	6,560	1,688,695.69	250	1,350,562	257.42	140,724.66
13. Dade	217,662	85,607,435.96	8795	66,551,377	393.30	413,562.49
14. De Soto	2,779	745,047.87	113	604,155	268.10	149,009.60
15. Dixie	1,620	483,697.32	65	337,560	298.58	120,924.25
16. Duval	125,826	37,303,096.81	5005	30,868,609	296.46	296,319.23
17. Escambia	48,713	13,978,521.97	1904	11,179,293	286.96	186,380.29
18. Flagler	1,466	430,080.64	64	354,924	293.37	143,560.33
19. Franklin	1,680	502,628.28	75	383,423	299.18	125,657.00
20. Gadsden	11,241	2,826,672.27	445	2,279,316	251.46	166,274.82
21. Gilchrist	918	341,656.87	50	264,896	372.18	213,985.66
22. Glades	1,004	323,423.63	44	243,982	322.14	161,711.60
23. Gulf	3,139	881,893.44	126	657,817	280.95	176,378.60
24. Hamilton	2,322	665,025.81	97	502,474	286.40	95,003.71
25. Hardee	3,574	890,694.68	125	725,517	249.22	148,449.16
26. Hendry	3,101	776,014.87	118	650,039	250.25	155,202.97
27. Hernando	3,304	996,856.41	140	797,643	301.71	166,142.66
28. Highlands	6,271	1,883,691.25	258	1,521,066	300.38	171,244.63
29. Hillsborough	101,915	26,649,095.63	3765	19,983,040	261.48	211,503.76
30. Holmes	2,954	880,631.08	126	673,782	298.11	125,804.42
31. Indian River	7,565	2,326,548.35	311	1,841,050	307.54	178,955.23
32. Jackson	9,053	2,455,016.77	385	1,989,347	271.18	122,750.85
33. Jefferson	2,955	809,160.94	120	639,093	275.69	115,594.42
34. Lafayette	701	255,335.69	36	184,157	364.25	127,668.00
35. Lake	14,810	4,596,445.45	632	3,573,591	310.36	127,679.02
36. Lee	17,016	4,659,043.57	652	3,767,079	273.80	160,656.67
37. Leon	20,442	5,516,217.61	886	4,368,077	269.85	190,214.41
38. Levy	3,008	927,274.85	133	727,758	300.28	92,727.49
39. Liberty	964	314,973.75	46	232,568	326.74	78,743.50

(continued)

TABLE 1. Continued

COUNTY-BY-COUNTY COMPARISON OF K-12 INSTRUCTIONAL COSTS IN FLORIDA FOR 1965-66

COUNTY	NUMBER OF STUDENTS	INSTRUCTIONAL COSTS (IC)	NUMBER OF TEACHERS	TOTAL INSTRUCTIONAL SALARIES	AVERAGE IC/STUDENT	AVERAGE IC/SCHOOL
40. Madison	4,086	1,111,668.29	165	854,176	271.82	123,407.55
41. Manatee	16,818	5,094,567.85	675	3,996,916	302.92	175,674.75
42. Marion	16,003	4,226,375.53	622	3,263,982	264.10	128,072.00
43. Martin	5,006	1,523,005.84	274	1,247,710	300.63	108,786.14
44. Monroe	10,427	3,087,078.93	384	2,452,675	296.07	280,643.54
45. Nassau	5,619	1,477,613.89	214	1,160,571	262.97	184,701.75
46. Okaloosa	21,940	5,334,626.62	812	4,521,834	243.15	190,522.39
47. Okeechobee	2,982	654,899.59	92	530,265	227.24	130,979.91
48. Orange	75,695	23,739,663.42	2,908	19,681,752	313.62	239,794.57
49. Osceola	4,822	1,347,943.27	192	1,102,894	279.54	149,771.44
50. Palm Beach	66,591	22,643,694.81	2,608	18,583,530	373.71	266,296.41
51. Pasco	9,105	2,247,772.25	324	1,787,260	246.87	124,876.22
52. Pinellas	74,473	28,394,145.21	3,174	22,918,784	281.26	260,496.74
53. Polk	54,345	15,788,009.85	2,033	12,957,232	290.51	171,608.79
54. Putnam	9,791	2,466,534.81	347	2,068,787	251.92	129,817.65
55. St. Johns	7,024	1,887,294.94	257	1,538,398	268.69	134,806.78
56. St. Lucie	11,209	3,175,824.59	414	2,554,901	283.33	264,652.08
57. Santa Rosa	8,190	1,989,803.51	305	1,563,475	242.96	117,047.29
58. Sarasota	17,165	5,842,069.11	747	4,596,168	339.95	254,003.00
59. Seminole	17,647	4,220,909.55	601	3,431,668	239.19	183,517.82
60. Sumter	3,714	1,053,294.06	149	840,076	283.60	87,774.50
61. Suwannee	4,413	1,283,402.85	201	923,531	290.82	142,600.33
62. Taylor	4,190	1,090,226.68	159	892,769	260.20	155,746.71
63. Union	1,292	142,686.34	62	305,730	319.42	137,562.00
64. Volusia	33,877	9,881,121.34	1,349	7,737,985	291.68	167,476.62
65. Wakulla	1,534	462,951.33	72	362,914	301.79	92,590.20
66. Walton	4,330	1,166,924.47	187	982,905	269.50	89,763.33
67. Washington	3,183	1,022,458.77	144	758,060	321.22	127,807.37
	1,330,552		52,386	\$333,500,460		

SOURCE: Florida Department of Education

TABLE 3
COUNTY-BY-COUNTY COMPARISON OF K-12 INSTRUCTIONAL COSTS IN FLORIDA FOR 1974-75

COUNTY	TOTAL NUMBER OF STUDENTS	INSTRUCTIONAL COST	TOTAL NUMBER OF TEACHERS	TOTAL INSTRUCTIONAL SALARIES	AVERAGE IC/STUDENT	AVERAGE IC/SCHOOL
1. Alachua	22,817	\$ 18,597,368.67	1,186	\$ 12,471,106	\$ 815.07	\$ 546,981.44
2. Baker	3,353	2,200,948.85	164	1,505,630	656.41	550,236.50
3. Bay	20,791	14,071,780.98	1,004	9,440,284	676.82	485,233.52
4. Bradford	4,261	3,045,828.75	221	2,045,207	714.82	435,128.42
5. Brevard	56,390	40,533,448.23	2,937	28,301,502	694.18	579,049.22
6. Broward	142,508	130,473,507.84	7,063	96,205,690	915.55	2,899,411.30
7. Calhoun	2,177	1,392,077.41	111	987,709	639.45	278,425.40
8. Charlotte	5,827	5,519,440.65	312	3,484,415	947.22	551,944.10
9. Citrus	7,527	5,654,600.86	357	3,922,879	779.73	565,460.09
10. Clay	13,746	8,087,101.31	683	5,933,480	588.32	505,433.81
11. Collier	12,954	12,024,546.57	630	8,001,481	928.25	601,277.30
12. Columbia	7,331	4,875,177.82	363	3,795,910	665.01	457,518.78
13. Dade	268,991	231,777,360.67	14,160	135,734,349	861.65	965,739.00
14. De Soto	3,695	2,459,165.33	213	1,795,831	665.54	409,860.83
15. Dixie	1,870	1,239,977.89	96	735,167	663.09	413,326.00
16. Duval	111,093	95,232,415.64	5,855	67,783,710	857.22	675,407.20
17. Escambia	48,555	39,003,897.72	2,483	28,658,154	803.29	582,147.73
18. Flagler	1,474	1,133,325.31	85	785,124	768.88	566,862.50
19. Franklin	1,842	1,251,799.74	91	834,015	679.59	312,950.00
20. Gadsden	10,169	6,710,721.21	527	4,792,196	663.84	447,381.40
21. Gilchrist	1,498	1,048,701.31	76	751,208	700.07	524,350.50
22. Glades	1,256	885,241.82	66	593,239	704.81	442,621.00
23. Gulf	2,871	2,034,378.32	149	1,403,396	708.60	406,875.60
24. Hamilton	2,424	1,853,225.02	131	1,166,785	764.53	308,870.66
25. Hardee	4,473	2,678,390.25	219	1,873,832	598.79	535,678.00
26. Hendry	4,021	3,487,851.65	210	2,556,692	867.41	496,923.28
27. Hernando	6,035	4,578,463.30	294	3,584,578	758.65	654,066.14
28. Highlands	7,367	6,494,314.06	433	5,045,966	881.54	649,431.40
29. Hillsborough	116,318	97,576,626.09	6,048	68,350,215	838.68	743,859.74
30. Holmes	3,345	2,176,897.90	172	1,606,754	650.79	310,935.42
31. Indian River	9,357	6,824,320.01	437	4,944,600	729.33	524,927.69
32. Jackson	8,353	5,622,215.69	409	4,234,821	673.68	511,110.54
33. Jefferson	2,433	2,321,966.22	150	1,642,062	954.36	580,491.50
34. Lafayette	839	488,364.25	41	357,052	582.08	488,364.25
35. Lake	17,728	14,855,249.28	941	10,499,680	837.95	436,919.08
36. Lee	27,180	22,077,616.62	1,269	15,642,149	812.27	538,478.46
37. Leon	22,752	18,771,114.45	1,299	12,646,684	825.03	552,091.58
38. Levy	4,158	2,948,914.17	227	2,111,428	709.21	368,614.25
39. Liberty	988	932,269.86	59	590,962	842.38	277,423.33

(continued)

TABLE 3, Continued
COUNTY-BY-COUNTY COMPARISON OF K-12 INSTRUCTIONAL COSTS IN FLORIDA FOR 1974-75

COUNTY	TOTAL NUMBER OF STUDENTS	INSTRUCTIONAL COST	TOTAL NUMBER OF TEACHERS	TOTAL INSTRUCTIONAL SALARIES	AVERAGE IC/STUDENT	AVERAGE IC/SCHOOL
40. Madison	3,459	\$ 2,363,765.71	202	\$ 1,786,022	683.37	295,470.75
41. Manatee	20,727	18,317,365.01	1,089	13,092,540	853.74	678,420.92
42. Marion	21,300	15,390,569.79	1,116	10,341,256	722.56	452,663.82
43. Martin	8,241	7,097,562.26	475	5,199,772	881.25	645,232.90
44. Monroe	10,558	8,336,513.37	577	6,105,722	769.59	596,465.21
45. Nassau	7,130	4,835,535.11	396	3,642,660	678.23	438,594.09
46. Okaloosa	26,306	18,786,360.08	1,392	12,531,254	714.15	521,843.33
47. Okeechobee	4,112	3,201,918.57	215	2,384,797	778.68	640,383.80
48. Orange	87,264	71,039,725.91	4,647	52,867,681	814.08	670,186.09
49. Osceola	7,646	5,921,416.84	425	4,226,307	774.45	492,431.41
50. Palm Beach	73,511	62,531,812.76	3,959	37,432,716	850.65	744,426.34
51. Pasco	21,023	17,953,146.79	1,016	12,972,494	854.01	730,571.60
52. Pinellas	95,785	86,517,414.12	5,290	63,379,565	903.25	752,325.33
53. Polk	62,561	44,656,425.63	3,100	31,916,323	713.81	496,182.51
54. Putnam	10,748	7,177,446.27	557	4,959,301	667.79	478,496.40
55. St. Johns	7,960	6,733,783.00	430	4,854,371	850.98	451,585.53
56. St. Lucie	12,450	8,388,256.02	608	5,766,832	673.76	599,161.14
57. Santa Rosa	12,083	9,795,389.16	642	7,092,571	810.68	466,447.09
58. Sarasota	24,948	19,809,765.97	1,145	13,676,352	794.04	861,294.17
59. Seminole	30,875	18,851,050.69	1,491	14,127,261	610.56	496,080.28
60. Sumter	4,650	3,303,567.02	253	2,467,700	710.44	330,356.70
61. Suwannee	5,034	3,263,569.71	220	1,934,409	648.31	632,714.00
62. Taylor	3,845	3,192,694.46	195	2,251,796	830.35	452,099.14
63. Union	1,510	2,097,317.74	79	763,779	726.70	365,772.60
64. Volusia	34,665	29,824,730.44	1,869	20,752,011	860.37	542,267.81
65. Wakulla	2,319	2,005,424.97	132	1,374,503	864.78	501,356.25
66. Walton	4,059	2,750,938.24	216	1,985,496	677.74	305,659.77
67. Washington	3,998	3,552,897.42	209	2,260,973	862.67	592,149.50
	<u>1,601,201</u>	<u>\$1,309,576,968.78</u>	<u>83,166</u>	<u>\$898,781,339</u>		

SOURCE: Florida Department of Education

on the basis of the level of student absences. Now, funding is based on program membership, taken various times during the year.

The instructional cost per school is a function of the size of the school. Broward County had a major consolidation of schools between 1965-66 and 1974-75 and went from 110 to 45 schools and to an average instructional cost per school of \$2,899,411. This consolidation did not immediately lower costs significantly. In the traditional educational system there does not appear to be a large potential for achieving economies of scale, i.e., decreasing unit costs as the size of the operation expands.

Overall, there has been an increase in educational costs during the ten year period. Rising costs have been due to monetary inflation and in most districts, rising enrollments. But there has been a real or absolute rise in expenditures due presumably to a desire for a better education system on the assumption that more money means better quality education.

Another major change over the years has been the special education programs which mean smaller sized-classes and more expensive teachers. For example, Alachua County had 563 more students in 1974-75 but had 323 more teachers than in 1965-66, many of these added for special programs. Also, 10 counties which had declining enrollments added teachers during the period, again to provide special education. It is interesting to note however, that in most school districts, an increase in the number of teachers did not mean a smaller student-teacher ratio, because of increasing enrollments.

Instructional Costs and Their Relationship to the Budget

Table 4 shows the ratio of instructional costs to the total educational budget by district in columns one and two for 1965-66 and 1974-75 respectively. Columns three and four give the capital outlay to total expenditures for the two time periods. Instructional costs declined as a percentage of the total budget in 55 counties and rose in 12 for the ten year period. In 1965-66 Duval County spent the largest amount--75% of its budget on instructional costs while Lafayette County spent a low 43%. For 1974-75, the highest was St. Johns County with 66% and Flagler County was low with 39%.

Capital Outlays have increased from \$84,024,019 statewide in 1965-66 to \$272,824,292 in 1974-75. Forty-one districts have increased the proportion of capital outlays in their budget and twenty-six have decreased them. Whether a district is mainly urban or rural seems to have no bearing on capital outlays increasing or decreasing. The number of student enrollments in a district also has little bearing on outlays. There were 25 counties with enrollments of less than 5 thousand; 13 counties between 5 and 10 thousand; and 29 with more than 10 thousand students. There is also little correlation between increasing enrollments and a district increasing or decreasing its capital outlays. School buildings last a long time and are replaced when the individual

TABLE 4

RATIO OF INSTRUCTIONAL COSTS TO TOTAL EDUCATIONAL COSTS BY
FLORIDA SCHOOL DISTRICT FOR 1965-66 AND 1974-75

COUNTY	ENROLLMENT	IC/TOTAL DISTRICT		CAPITAL OUTLAY (CO)/	
	CHANGE	SCHOOL BUDGET (TC)		TOTAL BUDGET (TC)	
	1965-66-1974-75	1965-66	1974-75	1965-66	1974-75
1. Alachua	3%	.70	.56	.11	.07
2. Baker	43%	.56	.47	.19	.20
3. Bay	16%	.68	.58	.09	.08
4. Bradford	11%	.64	.54	.12	.13
5. Brevard	3%	.51	.56	.29	.06
6. Broward	53%	.67	.60	.11	.13
7. Calhoun	- 3%	.63	.56	.06	.10
8. Charlotte	82%	.58	.53	.12	.16
9. Citrus	127%	.67	.57	.09	.11
10. Clay	99%	.57	.46	.21	.25
11. Collier	97%	.55	.44	.21	.28
12. Columbia	12%	.65	.39	.06	.32
13. Dade	24%	.75	.59	.06	.12
14. DeSoto	33%	.73	.45	.07	.24
15. Dixie	15%	.63	.51	.07	.08
16. Duval	-12%	.67	.67	.12	.04
17. Escambia	0	.72	.62	.07	.10
18. Flagler	1%	.62	.39	.13	.29
19. Franklin	10%	.66	.50	.06	.06
20. Gadsden	-10%	.66	.59	.17	.08
21. Gilchrist	63%	.63	.54	.05	.12
22. Glades	25%	.52	.48	.18	.13
23. Gulf	- 9%	.61	.53	.13	.08
24. Hamilton	4%	.50	.52	.25	.10
25. Hardee	25%	.70	.54	.05	.09
26. Hendry	30%	.53	.56	.16	.14
27. Hernando	83%	.63	.50	.15	.16
28. Highlands	17%	.71	.60	.07	.02
29. Hillsborough	14%	.68	.63	.10	.08
30. Holmes	13%	.66	.53	.07	.11
31. Indian River	24%	.68	.56	.05	.07
32. Jackson	- 8%	.72	.60	.07	.07
33. Jefferson	-17%	.61	.46	.15	.30

(continued)

district decides there is a requirement to do so. District growth and size have little influence. When enrollment is compared with total budget expenditures it only explains 36% of the total costs.

The county with the highest capital outlay was Dade at \$47,848,292 and the lowest was Lafayette at \$129,385. The average was \$177.88 per student in Dade and \$154.21 per student for Lafayette. These averages compare with 1965-66 figures of \$539.92 per student in Dade County and \$844.01 for Lafayette County. The lower averages probably reflect past building activities of the school systems.

TABLE 4 Continued

RATIO OF INSTRUCTIONAL COSTS TO TOTAL EDUCATIONAL COSTS BY
FLORIDA SCHOOL DISTRICT FOR 1965-66 AND 1974-75

COUNTY	ENROLLMENT CHANGE 1965-66, 1974-75	IC/TOTAL DISTRICT SCHOOL BUDGET (TC)		CAPITAL OUTLAY (CO)/ TOTAL BUDGET (TC)	
		1965-66	1974-75	1965-66	1974-75
34. Lafayette	20%	.43	.44	.37	.12
35. Lake	20%	.69	.67	.04	.07
36. Lee	60%	.64	.54	.09	.19
37. Leon	11%	.48	.56	.33	.13
38. Levy	35%	.68	.58	.06	.05
39. Liberty	2%	.57	.43	.05	.20
40. Madison	-15%	.67	.51	.07	.11
41. Manatee	23%	.58	.54	.09	.21
42. Marion	33%	.66	.47	.09	.23
43. Martin	63%	.66	.49	.10	.23
44. Monroe	1%	.68	.54	.04	.07
45. Nassau	27%	.50	.51	.24	.09
46. Okaloosa	20%	.51	.54	.34	.13
47. Okeechobee	43%	.57	.66	.12	.04
48. Orange	15%	.58	.62	.23	.11
49. Osceola	59%	.64	.43	.18	.29
50. Palm Beach	21%	.57	.58	.22	.10
51. Pasco	131%	.53	.50	.28	.29
52. Pinellas	29%	.68	.70	.11	.05
53. Polk	15%	.67	.55	.14	.13
54. Putnam	10%	.71	.57	.06	.08
55. St. Johns	13%	.64	.66	.07	.06
56. St. Lucie	11%	.70	.49	.08	.18
57. Santa Rosa	48%	.65	.49	.06	.25
58. Sarasota	45%	.66	.58	.09	.06
59. Seminole	75%	.69	.43	.09	.27
60. Sumter	25%	.68	.54	.07	.16
61. Suwannee	14%	.60	.54	.21	.09
62. Taylor	- 8%	.65	.52	.07	.21
63. Union	17%	.58	.45	.19	.20
64. Volusia	- 9%	.67	.55	.07	.20
65. Wakulla	51%	.61	.56	.12	.05
66. Walton	- 6%	.70	.44	.05	.25
67. Washington	26%	.63	.55	.10	.03

Expressed as a percent of the total budget, Columbia County's capital outlays were high at 31.9% and Highland County was low at 2.5%. Both counties are rural with Columbia in the Northeast portion of the state and Highlands in the central region. In 1965-66 the high county in terms of capital outlays was Lafayette at 37% in the northeast region and Lake County was low at 3.8% in the central region. Being a rural county in a certain region appears to be reflected in capital outlay level. Lake County and Highlands County spent a small proportion of their budget on capital outlays in both periods but Columbia County went from relatively low to high, and Lafayette County went from high to low between periods.

Myths About Why Costs Have Increased

There is a widely held misconception that educational costs have risen only because teachers' salaries have pushed them up. For example, from 1965 to 1975 the consumer price index (CPI) increased 62%. In the same time period the average teacher salary increased 69% and the total spent on teacher salaries 213%.

In comparison all other elements of the budget increased 328%. The category which had the largest percentage increase was fixed charges--up 943%. Fixed charges include insurance and judgments, rental of land and buildings, commissions and election expense. The second largest increase came in auxiliary services--up 772%. This category includes pupil transportation and food services.

Teacher costs increased not only through raises but also through an increase in the number of teachers and through an increase in teachers for special programs. The problem is that teachers' salaries comprise the largest single category and though the percentage increase is not as large as for other categories, the increase in absolute terms is substantial.

Student-Teacher Ratios

Number of students and number of teachers are very highly correlated across districts. This is a reflection of the relatively fixed student-teacher ratios. There is presently no state law or statewide education policy mandating a maximum pupil-teacher ratio. In the past there were "instructional units" composed of 27 students and one instructor. The mean for 1974-75 was 19.22 students per teacher. Average class size ranged from a high of 23 in Suwannee County to a low of 16 in Jefferson County which also had the highest average cost per student. The standard deviation or variance from the mean was 1.25 or 6.5%. If a criterion for quality education is a low pupil-teacher ratio it would appear that Florida's education system is in excellent shape. However, it should be noted that the statistics obscure differences within a district as well as those within individual schools. If this criterion for quality is followed more uniformly across classrooms it will raise the cost of education even more. Also, it is in direct conflict with a strategy to cut costs by increasing class size.

Conclusion

The purpose of this chapter has been threefold:

- To document the potentially disastrous financial situation facing public education in Florida over the next ten years;
- To identify where cost increases have been the greatest;
- To analyze educational expenditures to identify those categories which show the greatest potential for cost reduction.

Our analysis suggests that the Gross State Product has risen approximately 216% over the past ten year period; total personal income by 206%; total educational expenditures 254%. Thus, education would appear to fit the definition of a superior good: as gross state product and personal income have risen, the amount spent on education has increased more than proportionally. But as competing uses of the state's scarce dollars arise, it is likely however, that greater pressure is going to be put on the educational sector to keep costs down. The proportion spent on education cannot continue rising indefinitely and thus, there must be a closer look at the alternative means of producing educational outputs.

Teachers' salaries have risen less than proportionally to other expenditures for the ten year period 1965-66 to 1974-75. As a result they have dropped from 47.7% of the total budget to 39.9%. Thus, teachers' salaries were not the only reason for rising educational costs. As the cost of living increases there is pressure for wages to rise also. Since teacher salaries comprise the bulk of educational costs, inflation will cause salaries and thus total educational expenditures to rise. Significant price rises for food and motor fuels in the ten year period had their impact on the cost of auxiliary services; construction costs and land values have also risen dramatically in Florida during the period. All these expanding categories have caused the cost of education to increase.

However, since instructional costs remain the major component (58%) of the educational budget, it is likely that this category will receive the brunt of the cost-cutter's attention.

The following chapters present scenarios and information on potential means for cutting costs as well as possible consequences of attempting to maintain the status quo.

REFERENCES

1. Florida Department of Education. Analysis of projected enrollments, expenditures and revenues for public education in Florida 1974-75 through 1985-86. Author, July 1976. (A new study done for the DOE by Robert P. Hagemann et al, 1977, projects declining enrollments until 1982-83 under low economic growth conditions and then a very slow rise of 0.01% per year and under high economic growth conditions a fairly stable enrollment until 1982-83 and then a slow rise of 0.01 to 0.02% per year through 1985-86.)
2. Florida Department of Administration. 1976 Economic Report of the governor - Florida. Author, June 1976.
3. Florida Commissioner of Education. Annual report of the Commissioner of Education: Pupil and financial data. 1965-66 through 1974-75.
4. Florida Department of Education. Unpublished data from the Department of Education files.

Chapter 2

DRIFTING INTO 1985: A SCENARIO OF A POSSIBLE FUTURE FOR PUBLIC EDUCATION (K-12) IN FLORIDA

by

Cynthia K. Hoffman

Introduction

The following scenario is based on actual Florida Department of Education (DOE) projections for educational expenditures and revenue generation by 1985, given present expenditure trends and revenue sources (1).^{*} These projections indicate the requirement for at least a 20% decrease in educational expenditures by 1985. A statewide cutback of this magnitude could occur with minimal negative effects--and even a number of positive ones--as a result of planning. But it could also occur haphazardly with disastrous effects as a result of a failure to plan.

This scenario is at present only a description of a possible future. But it may resemble reality all too closely if the Florida Public Education System (K-12) continues to drift along for the next eight years merely reacting to situational crises by making minor revisions that promise to alleviate symptoms of evolving problems, rather than acting on the problems themselves. Based on present trends, let's see what the future might look like if we allow ourselves to drift.

The Fiscal Situation - 1985

The year is 1985 in the State of Florida. For seven years, the state's educational system has been fighting a losing battle to reduce expenditures.

Education expenditures presently account for 86% of the total state General Revenue Fund (GRF). That leaves only 14% for all other state services combined including environmental, health, roads, police, etc. In 1980, when the expenditures reached 74% of the GRF, the Legislature mandated a 26% decrease in educational funding within four years. But only 20% of the districts began work on that goal in 1980. At the present time only 5% have met their goal. But the small savings attained by these districts have been offset by increased expenditures across the state for the development of a program to identify and treat all emotionally disturbed clients (ages 3-21). This was in response to the enforce-

^{*}Numbers in parenthesis () refer to references which document sources of quotations and the validity of projections. A complete list of supporting documents can be found at the end of this chapter.

ment of a 1975 federal law* which was to have been fully implemented by 1980 (2,3). The remaining 80% of the districts in the state have waited until the deadline year to begin work on compliance. They are now faced with achieving a 26% cutback in one year.

Seventy-four percent of this required cutback is related to an increase in total educational expenditures since 1974-75 just to keep up with population growth. And 26% of the required cutback is related to the expansion of selected programs for the purpose of serving greater numbers of their target populations. (The expenditure for expansion of the emotionally disturbed program, as mandated in 1981, was an unplanned addition not included in this figure.)

Increasing Student/Teacher Ratios As An Intended Solution

Inasmuch as teachers' salaries represent the largest portion of the educational budget in our labor intensive system, the first attempt to reduce expenditures came in the early 1980's when some districts put a freeze on hiring new teachers. Because the largest percentage of the required cutback was found in increased expenditures for hiring new teachers to support a larger student population, it seemed obvious that the solution was to eliminate hiring of additional teachers and allow the student/teacher ratio to increase to adapt to the growth in student population.

In response to the "cutback crunch," a more dramatic version of this intended solution is being adopted this year by most of the districts in the state. The decrease in expenditures for teacher salaries is being achieved by laying off the required number of nontenured teachers. The student/teacher ratio has been increased since September from 30:1 to 50:1 (on the average throughout the state) with no provision for extra nonprofessional personnel or other classroom support for those teachers who weren't laid off.

Historical Perspective

Ninety percent of all teaching paraprofessional and clerical helpers** in the state were gradually eliminated during the 1980-1984 period in an

*Public Law 94-142 was passed by the United States Congress in 1975 and was to be fully implemented by 1980. It stipulates that the public schools must provide education for every handicapped citizen (no matter what the handicap) from ages 3-21.

**Advanced technology word-processing machines were purchased in 1980 with the intent of increasing efficiency in the long-run even though the initial outlay caused a budget drain. But the clerical workers either would not or could not learn the new techniques. The machines could be liquidated, and the failure to realize the intended savings over the next three years compounded the funding problem for that area of the school budget.

attempt to cut personnel costs without incurring the wrath of the teachers' unions by cutting out professional teachers.

The other major source of help for classroom teachers--parent volunteers--are no longer available either. The volunteer program, which flourished in the late 70's to provide help for classroom teachers without increasing educational costs is now dead for a number of reasons. The first is tied to the stringency of the negligence liability laws. The increase in the number of students that each teacher had to monitor resulted in an increase in the occurrence of student violence against students and teachers. This, in turn, led to an increase in the number of negligence liability suits; and volunteers who were the only adults present in many of these situations often found themselves involved in these suits. Thus, the number of willing volunteers declined. And second, since school administrators were ultimately responsible for the negligence of an unpaid volunteer, the increasing incidence of negligence suits turned administrators as well as potential volunteers away from the program. The final deterrent was the amount of time and effort required by teachers and administrators to coordinate the program.

Far-reaching Potential Effects of the Intended Solution

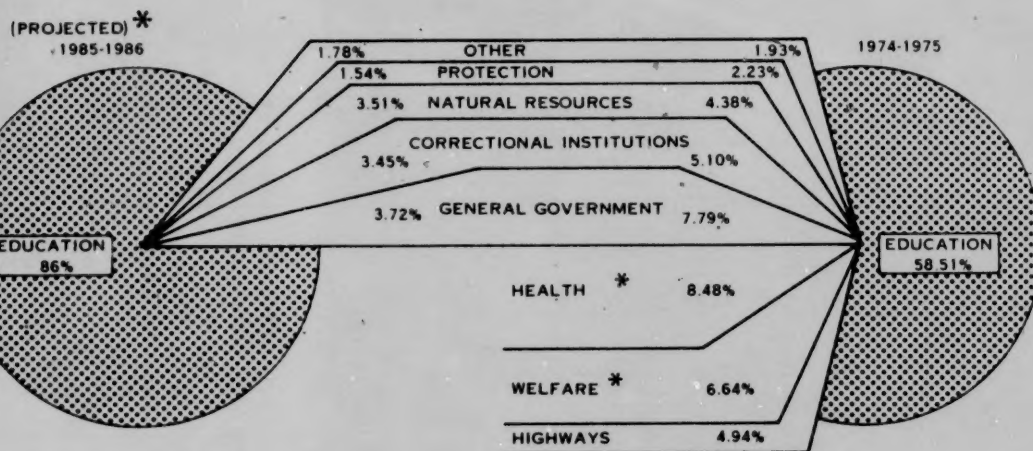
The only help teachers are now getting to handle the increase in discipline problems is a police officer in every corridor. This is a quick and cheap solution, because the police protection is provided at no cost to the schools on a temporary basis during this emergency situation. The use of public police officers is extremely controversial for many reasons. Some educators and parents despise the idea of the police officers' presence in the schools because they feel that it eliminates the humanistic atmosphere which schools should have. Still others view it as an even further encroachment of public education on other services provided by the GRF. Many taxpayers believe that public education is already getting more than its share of the state revenue. Percentages of the GRF in each service area can be seen in Figure 1 on the next page.

The use of public police officers seemed at first to be a cheap remedy, but the free service was only short-term during the initial stage of the emergency situation. Moreover, the schools have come to depend on police authority to maintain discipline, especially in light of the fact that school laws and policies continue to perpetuate U.S. public schooling as a "right" rather than a "privilege" (4). When the free service was withdrawn, hiring private officers to perform this security function increased the cost of operating a school. And with the decrease in adult supervision in the schools (given the increased student/teacher ratio), there was no break in sight in the already skyrocketing school violence rates. State averages have shown a dramatic rise in school violence at all levels since 1976, with a 126% rise in grades 9-12 and 315% rise in grades K-8. They also have shown a 186% increase in vandalism, which has cost the state an average of \$15 million per year since 1982.

Early manifestations of the present situation were detected back in the mid-1960's and became a topic of intensive investigations in the early 1970's by a United States Senate Subcommittee chaired by Birch Bayh. The results of the investigations were shocking to many.

FIGURE 1.

EXPENDITURES OF THE FLORIDA TAX DOLLAR FROM THE GENERAL REVENUE FUND (GRF)



* FEDERAL FUNDING FOR STATE HEALTH AND WELFARE PROGRAMS HAS INCREASED FROM 50-100% BETWEEN 1979-1985; THUS THEIR ELIMINATION FROM THE GRF. SUPPORT FOR HIGHWAY PROGRAMS NOW COMES FROM EXTERNAL TRUST FUNDS THUS ITS ELIMINATION AS A CATEGORY IN THE GRF.

In addition to reporting nationwide figures for the rise in school violence and vandalism between 1970 and 1973, the Subcommittee also reported these figures for each region of the country. Two hundred sixty-one questionnaires were sent to school districts in the southern region (which included Florida), and 71.6 percent were returned, completed. The findings for the three-year period from 1970-73 were as follows:

- Homicide increased by 25.4 percent;
- Rape and attempted rape increased by 28.4 percent;
- Robbery increased by 51.7 percent;
- Student assault on student increased 276.9 percent;
- Student assault on school personnel increased by 316.4 percent;
- Burglary and larceny increased by 28.1 percent. (5, p.27)

The increases in personal assaults and school vandalism seemed to go hand-in-hand, and the Bayh Subcommittee cited evidence of the rapid increases in school vandalism nationwide. A survey of 39 cities across the country reported vandalism losses of over \$12 million in 1968-69. In 1971 a report, prepared by Education U.S.A. and the National School Public Relations Association estimated that vandalism was costing \$200 million annually. And just two years later Norman Scharer, President of the Association of School Security Directors stated that a conservative estimate of the cost of vandalism, thefts, and arson to the almost 15,000 school districts in the country was over \$500 million for the 1972 school year--equivalent to the total amount expended for textbooks throughout the country that year!

In addition to increasing costs for security guards, fencing, intrusion and fire detectors, special lighting, emergency communications equipment and vandalism resistant windows, a substantial rise in insurance rates was reported as a consequence of the increase in vandalism.

The costs of violence, theft, and vandalism reported above do not reflect losses in learning effectiveness which impact upon student employability and survival once the learner exits from the education agency (6). These losses have become additional costs not only to the educational system, but to the external social and economic systems as well.

Program Reduction As An Intended Solution

Another approach to expenditure reduction is causing a whole set of negative effects, some of which are very different in nature from those related to the increase in class size.

In response to the second largest category of expenditure increases since 1974-75--expansion of selected programs--the next most popular solution adopted in many districts at the beginning of this 1985-86

school year has been the severe reduction and/or elimination of special programs. Specialty teachers for art, music, remedial reading, and physical education have been eliminated in many of the district elementary schools where this approach was employed.

In the secondary schools in such districts, elective courses with less than the minimum registration of forty students have been cut out of the program, and those nontenured elective teachers have been laid off. Tenured teachers whose elective classes haven't been filled are teaching out of field in courses with typically large registrations.

One of the results of this quota system is that most of the traditional elective subjects are being offered only in the largest high schools in the state. Smaller schools have become "basics" schools with little opportunity for individualization of curriculum. Most of the students take the same courses--the basics plus any other courses required by law to graduate.

Effects of Program Reduction

This situation has served as a catalyst to revitalize a movement of the mid-70's among proponents of equal educational opportunity who sought to broaden the court's requirements to include "equal access" as well as "equal per pupil expenditure." There are now fifteen class action suits pending hearing in circuit courts around the state, each one dealing with denial of access to elective subjects which are made available to students in neighboring districts with larger high schools.

Another problem that has surfaced since the beginning of this year is due to the fact that most elective classroom facilities built during and prior to the 1970's only accommodate 18-25 students. So after the 40-student quota is met, another problem usually presents itself immediately. The problem is related to the difficulties of teaching a minimum of 40 students in a laboratory, shop, or studio designed for 18. The burden falls on the teacher to reorganize instruction according to the situation. Particularly industrious teachers are providing 2-day labs or studio set-ups so that each half of the group can participate. But due to the logistical problems of resetting a lab for a second group and leaving equipment set up unprotected overnight or while other groups use the room, the fact is that most elective teachers are doing 50-75% fewer experiential activities and much more lecturing and large group activity. Since the objectives of most of the elective courses are facilitated best by direct "hands-on" experience, the indirect fact-learning acquired from lectures and reading falls short of many of the experience-based direct learning objectives to be gained in those courses. For example, the student who can write an "A" paper describing the process of internal combustion cannot necessarily change the spark plugs in his or her car.

Another result of this intended solution is that, in response to a desire for self-preservation, many teachers who teach elective courses are trying to attract students to fill the quota by making their courses "easy"--that is, by lowering academic standards, allowing students to leave early, etc.

It is suspected that there has been a serious decline in effectiveness of the Florida public schools. However, this assumption can't be validated because the statewide assessment program has been eliminated at all levels except 12th grade due to the cost of such testing. The only real indication is that the steady nationwide decline in standardized achievement test scores which had originally been detected in the early 70's (7) was strongly reflected in Florida's dropping averages at the last full-scale statewide testing in 1982. And with Florida's schooling problems since then, there's no reason to assume that the downward trend is anything but continuing.

Combined Effects of Program Reduction and Increasing Student/Teacher Ratios

A number of major effects of these intended solutions are related to the reactions of the state teachers' union. It has initiated extensive breach-of-contract litigation for layoffs, out-of-field assignments, failure to comply with class size contract stipulations, etc. This is costing the state millions of dollars in legal fees, which cancel out most of the savings gained by the various solutions intended to save money. The union has also sponsored two three-day walkouts in 45 districts and three major four-week strikes across the state in protest of existing conditions for teachers. The situation for students during strikes and walkouts has been much worse than the statewide strike in 1968 because there are now very few willing volunteers due to the increase in school violence and the problems experienced by volunteers in the late 1970's.

An important effect of the massive teacher layoffs related to both intended solutions has been a high increase in costs to the state unemployment system--further encroachment by public education on the other sectors of the GRF!!

Attempts At Solving the Problems With New Management Techniques

Many have believed all along that our school problems are due to mismanagement and that the solution lies in the adoption of new management systems.

One of the most influential lobbying groups in the Capitol has been the Educational Management Quorum. It convinced the legislature to fund two multi-million dollar statewide management systems in the late 1970's.

The first was the BAPS (Budget Allocation Planning System) which made it possible to determine exactly how much money was being spent on each student in each class and program. The system was funded for two years, and it resulted in numerous innovative budgeting methods. But it was not designed to yield information on how to decrease the costs or increase effectiveness of schooling in the state. It kept tally on the cost of the means of education but did not relate this cost to the ends (8).

The second system was the Florida Management Information System (FMIS) which was implemented by a computer network for data processing

and system modeling. The computer network was developed by making the required additions to existing systems around the state.

The FMIS was funded for three years, and its main contributions were:

- Clarifying management problems via computerized modeling techniques; and
- Facilitating informed decision-making within the set parameters of the existing educational system.

However, it was judged as too costly when major replacements in software and hardware were required to update the system; so the funding for the program was discontinued. The original system had cost a total of \$14.5 million--with personnel costs representing approximately 60%, and hardware and software costs representing only approximately 20% each inasmuch as they were only supplements to existing systems. But when those existing systems became obsolete, the projected cost of hardware and software replacement was more than \$10 million since totally new systems were required rather than selected additions to the old one (9).

When the program was discontinued a small percentage of the personnel costs were eliminated, but most of the personnel were retained for other data processing functions. A small percentage of the original hardware and software is still being used for other functions; but approximately \$2.5 million worth of FMIS software now sits idle in storage, and the computer network hardware which cost approximately \$3 million is currently being utilized to only 10% of its capacity.

The FMIS lobbyists tried desperately for two sessions to convince the legislature that their system could actually save money if the districts would experiment with major changes in the parameters for their modeling procedures--for example, extended and shortened school years, increased student/teacher ratios, elimination of compulsory attendance laws, large scale implementation of home-based learning, etc. But their arguments were fruitless because no one wanted to experiment with the way teaching has been organized and delivered in the past; the funding for the FMIS was not renewed.

Reduction of Maintenance Costs As An Intended Solution

Another area of major concern at present is the condition of school facilities in the state (10). District maintenance teams and school-based custodians have been eliminated in 90% of the districts in the state with teachers being expected to do their own cleaning and maintenance. Classrooms are dirty; heavy infestations of roaches are common; and serious rat problems have been reported in 32 districts. Broken light fixtures, desks, chairs, doors, windows, etc., are left unrepaired. There has been a 75% increase in the number of reported robberies in schools around the state. The dollar value in losses due to these robberies is estimated to be \$750,000 in cash, equipment, and supplies. This sum was for the 1983-84 school year alone (5).

Lack of maintenance of school grounds has resulted in a 40% increase since 1983 in negligence suits against districts. The suits stem from student injuries due mainly to faulty playground equipment and to accidents in which children were hit by cars after they had run into the street through broken playground fences.

Leaking roofs, faulty climate control, faulty plumbing, and many other problems have been found in 95% of the school buildings built since 1980. Since 1981, in an effort to save money in capital outlay and debt service, districts have been seeking the lowest bids available with little concern for quality of construction. As this trend became evident, contractors found increasingly cheaper (and correspondingly poorer quality) methods and means for building a school, so that they could enter the lowest bid. As a result,

- Approximately 25% of the school buildings in the state are barely functional at present--adding to the rapidly rising level of discontent among students, parents, and teachers as well as to the increasing costs of litigation--parents against districts, and districts against contractors; and
- These buildings will probably last only 1/2 of the average life expectancy for a school building built prior to 1980.

Elimination of 12th Grade As An Intended Solution

Another method which was employed to save money last year in 15 districts was the elimination of the 12th grade. This movement started when it was realized that approximately 70% of the students in Florida could achieve criterion level for graduation on the statewide assessment at the end of 11th grade. It was first decided that these 70% would be graduated early in an effort to decrease the costs of providing 12th grade schooling, but further investigation revealed that utilization of facilities and teachers for the remaining 30% would be very inefficient. So total elimination of the 12th grade was implemented in those districts which chose this intended solution.

No provisions have been made for incorporating this newly-leisured group into the work force via either apprenticeships or paid positions with the institution of a dual minimum wage, as described by Coleman (11).

Many of the college-bound students in these districts have found that they do not meet college entrance requirements for most of the private institutions of higher education in the country and many of the more selective public institutions, since their high school programs had been planned so that they would have completed those requirements during the 12th grade.

Preliminary estimates have shown a 45% increase in juvenile delinquency for 17 year-olds in those districts and surrounding areas.

Approximately 55% of the affected students have enrolled in vocational schools in their areas, which has caused a heavy increase in funding for vocational education in the state. Although nontenured 12th grade teachers were laid off, the existing tenured teachers have had to be placed in other jobs. So the decrease in cost achieved by elimination of the 12th grade has been offset by an increase in cost brought about by the increased demand for vocational education. In fact, this intended solution has caused a net increase in total state education expenditures because vocational education tends to be more expensive than basic skills education.

Present Crisis - 1985

Isolated cases in which schools have had to close down for differing lengths of time--or shorten their school year--due to insufficient funds were found as early as the mid-1970's (12, 13, 14, 15). But this year, even with all these intended solutions, 20 districts have closed several of their schools indefinitely; and 37 districts have declared a shortened school year--from 180 to 120 days. Surrounding districts have been required to accept students from "bankrupt" districts. The average student/teacher ratio in many of these schools goes as high as 70:1.

The situation has deteriorated to such an extent that there appear to be few, if any, desirable alternative solutions. This is no longer "a problem in the Florida school system;" it is a statewide problem pervading nearly every other aspect of the Florida social and economic system. In fact, it threatens to pervade the national social and economic system since it has become too large to be handled autonomously by the state.

The president of the Florida Teacher's Union declared last evening that there will be a statewide teachers' strike within a week if the governor does not sign a union-prepared resolution to rehire the number of teachers required to decrease the average statewide student/teacher ratio to 40:1 (in addition to a number of other secondary demands).

In response to this situation, the governor has declared a state of emergency in Florida, requesting \$250 million in federal funds and a revision of the state law to allow deficit spending. Neither of his requests has yet been granted.

Conclusion

Alvin Toffler saw the roots of potential crisis pervading all of our society in the early 1970's. Although the following quotation from his book The Eco-spasm Report did not pertain to education per se, it is quite applicable to the situation that has evolved in public education in Florida and many other states nationwide. In Toffler's words:

The idea of a quick "economic fix" is just as dangerous as the comparable idea, popular among certain narrow scientists,

that there is for each of our difficulties a neat, quick "technological fix". . . No doubt we must on occasion make trade-offs between immediate economic gain and long-term social and ecological health. But, if we do, we ought to know in advance what these trade-offs are likely to entail. Only in this way can we avoid "econo-think"--our traditional failure to see how economics interconnect with other systems--social, cultural, and ecological (16).

The interaction of economic, social and education systems has increased the negative effects of the problems in Florida's public schools. The crisis has become greater each time an uncontrolled problem in the education system has spilled over into the other systems. New "fixes" in the education system have become less and less effective. In fact, the "fixes" themselves have often caused new problems in the other related systems. A prime example of this is the drain on the state unemployment system due to extensive teacher lay-offs. Another is the increase in school violence and vandalism which has accompanied the increase in student/teacher ratios.

The outcomes described in this scenario are extremely painful to contemplate---let alone experience. These are some crucial questions which must be addressed if crises of the type described herein are to be avoided in the future. The two major questions are:

- How did we get into the present situation?
- What could be done to prevent the forecasted disasters from happening?

The latter question could be restated in a number of ways, as reflected in the questions which appear below. Each one addresses a specific approach to preventing some or all of the disasters which occurred in this scenario. These approaches are described fully in the referenced chapters.

1. Could this crisis have been avoided by instituting large scale technological applications such as instructional television, computer-assisted and computer-managed instruction, or programmed instruction systems? (see Chapter 3)
2. What might have been the potential for increasing cost-effectiveness through the use of small-scale technological applications such as individualized instructional programs mediated by such means as audio and video cassettes? (see Chapter 4)
3. Are the compounded problems described in this scenario just chance happenings or can they be predicted and planned for? (see Chapter 6)
4. What are the basic assumptions upon which our public school system (K-12) is based? Does a change in some of these assumptions offer potential for avoiding a disaster such as the one described in this scenario? (see Chapter 7)

AFTERWORD

Given the extensive attention and effort which has been focused on implementing intended solutions to the problems in our public educational system, why are there still so many problems?

The following tale might shed some light on the answer to this question:

There once was a poor farmer in India who had a small flock of chickens. When his chickens began to die, he went to his guru and asked, "Oh, Master, what should I do? My chickens are dying." The guru asked, "What do you feed them, my son?" "Wheat," replied the farmer. "Then feed them corn, my son."

The farmer left only to return another day. "Oh, Master, my chickens are still dying," he reported. "From what do they drink, my son?" queried the guru. "Bowls, my Master." "Ah, use a trough, my son."

The farmer left pleased but returned yet a third time. "Master, oh Master, my chickens are still dying. What should I do?" The guru paused and then asked, "Where do they live?" The farmer explained, "In a wood shack with four walls." "Ah, my son, remove the walls. Let more air in."

The farmer left once again, intent on saving his chickens. A few weeks later, however, he returned. In a sad and resigned voice he announced, "Master, oh Master, my chickens are all dead." The guru shook his head and with a sigh, intoned, "Tis a pity, my son; I had so many more solutions."

(17; p. vii)

The Guru could be likened to a decision maker who believes that he or she is making a real contribution by coming up with new "solutions"--regardless of whether or not they work. As long as the real problems are not defined, the "solutions" can only work if, by chance, they happen to match the problem. This trial-and-error approach can be very costly, as the farmer discovered. It cost him his investment in "solutions" as well as his chickens.

REFERENCES

1. Florida Department of Education. Analysis of projected enrollments, expenditures, and revenues for public education in Florida 1974-75 through 1985-86. (author) July 1976.
2. U.S. Congress Public Law 94-142.

3. Hodenfield, G. K. Public schools must open doors to handicapped children soon. Tallahassee Democrat, June 16, 1977, p. 8.
4. Ladd, E. T. Regulating student behavior without ending up in court. Phi Delta Kappan, 1973, 54: 304-9.
5. Bayh, B. (Chairman) Our nation's schools--a report card: "A" in school violence and vandalism. (Preliminary Report of the Subcommittee to Investigate Juvenile Delinquency--Based on Investigations, 1971-1975). Washington, D.C.: U.S. Government Printing Office, 1975.
6. Kaufman, R. A. Educational system planning. Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1972.
7. Narvaez, A. A. Educators rue poor test scores. New York Times, November 1976, p. 8.
8. Magaro, J. D. PPBS; a means toward accountability. AV Instructor, 1975, 20: 10-12.
9. This projection evolved on the basis of consultation with Howard Milliken, Department of Education.
10. Huntley, H. Lack of maintenance causing serious school deterioration. St. Petersburg Times, April 14, 1977, p. 32.
11. Coleman, J. S. (Chairman) Youth: Transition to Adulthood -- Report of the Panel on Youth of the President's Science Advisory Committee. Chicago: University of Chicago Press, 1974.
12. Closed schools in Oregon district pose dilemma for the taxpayers. New York Times, November 1976, p. 18.
13. Stuart, R. At least 10 Ohio school districts, left fundless by voters, are closing for the Christmas holidays. New York Times, November 1976, p. 34.
14. Hanna, J. Fewer students means school system deficit. Tallahassee Democrat, April 5, 1977.
15. Hanna, J. School budget crisis worsens. Tallahassee Democrat, April 18, 1977, p. 13.
16. Toffler, A. The eco-spasm report. New York: Bantam Books, Inc., 1975.
17. Stewart, C. T., & Harvey, T. R. (Eds.) Strategies for significant survival. New Directions for Higher Education, 1975, 3, (4).

Chapter 3

INSTRUCTIONAL USE OF TELEVISION AND COMPUTERS IN BASIC EDUCATION (K-12)

A SUPPLEMENT TO THE REPORT OF THE COMMISSIONER OF EDUCATION:

A SCENARIO

by

Craig Hewitt

Introduction

This supplement to the Commissioner's Report for 1985-86 was written to explain how the Florida education system arrived at its present status and why it was decided to pursue extensive use of technological applications within the system. The problems of rising enrollments, monetary inflation, and a more labor intensive education system when compared with the rest of the economy became apparent in the mid-seventies. The Department of Education undertook various studies to determine the best course for Florida to follow to alleviate the financial problem.

There were two possible ways to approach the problem: first, externally by increased funding from new taxation; or second, internally through restructuring of the education system. The solution involving restructuring would include the heavier use of machines, i.e. capital equipment such as computers and television. Increasing funding through new taxation was seen as a stop-gap measure which could temporarily solve the financial problem but do little for the additional problems of increasing costs and declining effectiveness in the public schools. Thus, internal restructuring with added emphasis on using computer-assisted instruction (CAI) and instructional television (ITV) was chosen as the solution.

A statewide system was chosen because of economies of scale. Large initial costs for equipment, programming and system building can only be justified when spread over many users; that is, all of the 1.5 million district school students. Some local control had to be given up but programming is now done by personnel who do professional quality work whereas in the past some students received mediocre or poor teaching. The centralized facilities are available to districts which prefer to produce some of their own localized programs. Basic CAI programs in subject areas such as math and English grammar are designed to achieve learning in the most effective manner. There has not been as much resistance to standardization of instruction in these straightforward areas.

One of the main problems with introducing heavy technological applications is high initial costs. These include not only hardware costs but software costs as well. The Department of Education determined that to achieve the necessary savings to purchase the equipment and develop the required instructional programming, the number of teachers would have to be reduced. But to achieve this without major disruption it was done through attrition; every year approximately 6000 teachers either retire or terminate for various other reasons. Therefore, by replacing only 1400 a year in crucial positions, a net savings of about 13,800 positions or 17% was realized over 3 years. By applying the average 1974-75 salary of \$10,984.90 a gross savings of \$151,591,620 was realized for the three years statewide. Thereafter, the \$151 million was available for paraprofessionals' salaries, programming, and new equipment. There must be a responsible teacher supervising, but one teacher with paraprofessionals can oversee over 200 students in a learning center.

Paraprofessionals have to be hired for monitoring purposes at \$3.25/hour or \$4,200 for 9 months or \$57,960,000 total for 13,800 positions. This gives a net savings of \$93,631,620 to be applied to hardware, software and specialists to run the system. The savings were realized by having each student in the system either watching ITV or using a computer terminal or a combination of both for a total of one hour per day. The rest of the time the students are in their regular classes.

There were of course many difficulties and hardships during the transition period. Transmitters, receivers, phone lines, etc. could not be installed overnight. But district by district, the schools were brought on-line and within reception distance throughout the state. Transmitters were first installed in the larger districts to reach the largest audience and to immediately begin utilizing the new system. Communities with cable systems were able to access the regional computers almost as soon as they were installed. Smaller districts were eventually added to the statewide system as transmitters were installed and hookups made to regional computer systems. The smaller districts were added to the regional networks as they felt the need.

As with any change, there was initial resistance. The teachers felt threatened until they discovered that the use of instructional media would not put them out of a job. The students welcomed the change when they went to media learning systems for alternative instruction. Not only did they learn more rapidly, their self-esteem and level of aspiration improved as they achieved the required mastery of a subject (1).*

The following sections will explain the rationale behind the choice of solutions, the means of implementing the systems, and the uses and benefits of the new structure.

*Numbers in parenthesis () refer to references which document sources of quotations and the validity of projections. A complete list of supporting documents can be found at the end of this chapter.

Shifting from a Labor-intensive to a more Capital-intensive approach

The traditional education system is very labor intensive, i.e., the method of producing goods or services where the greatest monetary expenditure is for human effort. As prices rise during inflation, teachers' wages must also rise to maintain a certain standard of living. As enrollments increase teachers must be added to maintain a given pupil-teacher ratio. If the pupil-teacher ratio is allowed to rise, behavioral control of the class becomes a predominant factor, individualized learning becomes less possible and effectiveness drops.

Capital equipment has the advantage that once the initial purchase has been made there are no more incremental payments year after year. There are operating, maintenance, and repair costs but these are relatively small compared to the recurring costs required to pay human labor to perform the same functions. Useful life for the equipment is considered ten years. It will actually last much longer but with the technological advances continually being made in computers and the decreasing costs over the years for a system of a given capability, replacement will probably be desired to take advantage of developments.

Rather than continue an outmoded system that would literally become more expensive to operate every year, Florida chose to develop a more capital intensive education system.

Rationale for using ITV and CAI

When the Florida Department of Education began looking at technological applications it found a profusion of hardware and software systems on the market or being tested and developed. A survey was made in 1974 of the research done on the effectiveness of alternative instructional media which included traditional instruction (TI), instructional radio (IR), instructional television (ITV), programmed instruction (PI) and computer-assisted instruction (CAI) (1). Except for standardized achievement testing used with computer-assisted instruction (CAI) for disadvantaged elementary and secondary school students, investigators found little consistent evidence that one instructional medium was more effective than another. One of the more surprising findings was the lack of any consistent patterns indicating that varying the nature of TI inputs provided by schools would change students learning. The only exception to this generalization was that teacher verbal ability was positively correlated with student learning and that smaller class size might slightly improve primary grade students' performance (1).

Britain's National Council for Educational Technology had this to say about choosing a particular technology:

The technical arguments for the superiority of any one system over another are not decisive. Neither are the economic factors so clear-cut as to suggest that any one system should be rejected out of hand. . . . The decisions that determine the choice of a system to install can therefore be primarily educational ones. . . . At the final resort many questions of educational provision resolve in arguments about finance (2).

A major advantage, especially true of ITV, is that additional students can be added to the system for a very small marginal cost. It is very easy and relatively inexpensive to add an additional television receiver or video tape machine to use the ITV network. Adding computer terminals is more expensive but the larger computers will handle up to 4000 terminals. Courseware for the systems is initially quite expensive but when prorated over large numbers of students the cost can be as low as 5¢ per student per hour (5). Also, after a course is developed and taped or programmed it can be used over and over, year after year. It doesn't deteriorate and can be improved and updated.

The increased use of technological applications has decreased learning time of students (1). This has been translated into cost savings through less time in school, less use of facilities and less need of supportive systems. Not only have time savings led to cost savings but there has been an additional benefit of increased quality--quality here referring to increased curriculum variety, attendance and student morale.

Instructional methods should be the outcome or product of two concerns: (a) the needs of students; and (b) the practical and cost constraints of the system (including those arising from a chosen method of information delivery). Usually, it is not the pedagogic difficulties that cannot be overcome, but the administrative and organizational rearrangements that would be necessary in any given institutional system, if methods of computer or video teaching are to be optimized (3). Therefore, the flexibility of the Florida educational system and its willingness to change its basic structure of instruction were crucial to meet the demands created by a changing populace, new technology, and increasing costs. The increased use of CAI and ITV has helped Florida meet these demands.

Instructional Television (ITV)

The State of Florida has built a state-wide ITV network using existing educational television station facilities where possible and building new transmitters where required to provide access to the network for every district. Most instructional programs originate from a central studio which was completed a short time ago. This center also enables the system to have a single and more extensive library of film and television materials to serve the entire state. Thus, the materials are carefully maintained and handled only by professionals. In the local school a single television distribution system can provide both film and TV at the "touch of a button" without screens, darkened rooms, or expensive, hard to operate projectors.

The strength of a single statewide system is that it can produce and send a signal quickly and efficiently to every school. But it cannot easily adapt to the almost infinite variation in schedule and content of individual classes. Therefore, video tape recorders are installed in each school to record the programs as they are transmitted to be played when required. This allows broadcasting at off-hours from the educational stations to the schools by a remote signal that turns the recorder on and off.

ITV can be very economically attractive if the basic capital and operating costs can be assigned to mass distribution and only the marginal costs to instruction at the local level. The marginal production costs for ITV are about \$1 million per year in 1972 dollars based on \$1000 per hour for 180 days for 6 hours per day (4). Thus, an hour of instruction once produced can be seen by every pupil, at the level for which the program is intended, anywhere in the state.

To make the ITV system work, the problems of developing a new instructional medium and exploring its potential had to be met in order to integrate content, schedule and format. Administrators, teachers and curriculum planners had to work together to plan the system and overcome regional differences, teaching philosophy and patterns of use. Also, to fully realize cost savings and to justify the high initial costs the state had to insure adequate utilization of the system. Therefore, there must be enthusiastic teachers and planning at the beginning of each year with ITV providing: (A) enrichment; (B) additional instruction; and (C) training for the professional staff (4).

The costs of ITV are as follows:

(A) Development costs -- these include planning, construction of any buildings, transmitters or equipment that are required;

(B) Production costs -- these include the cost of developing the courseware and producing the programs;

(i) direct costs -- these are costs that increase as the number of programs increase;

(ii) indirect costs -- "overhead" such as costs of maintaining buildings, equipment, salaries, services, etc.

(C) Transmission costs -- cost of delivering the electronic signal. Possible means include:

(i) open broadcasting;

(ii) cable-antenna TV (CATV);

(iii) video tape cartridge (VTC);

(D) Opportunity costs -- this is what is given up in order to purchase the system -- "the next best thing";

(E) Distribution costs -- none for open broadcast, CATV has rental cost, VTC mail or delivery charges;

(F) School hardware -- video recorders and receiver costs;

(G) School software -- costs of locally produced programs (3).

The various delivery sub-systems (i.e., open broadcast, cable, videotape recorder, and videodisk) each have a unique advantage. The open broadcast system, once in place, can be received by a practically limitless number of receivers within its range. Thus, the local populace can receive programs in their homes as well as in the schools. A disadvantage is the high initial cost of a transmitter plant: from \$1.2 to \$1.5 million (8). A fully implemented CATV (i.e., cable) system will support ITV signals as well as CAI with interaction by the user. A disadvantage is the limited distribution of CATV, especially in remote areas. The video tape cartridge or disk is very inexpensive and can be wiped and used again -- up to 250 times; it can also record off-air and be played back later, thus giving more flexibility. Disadvantages are one-way programming and, if not produced locally, delays in delivery.

Typical video tape system costs are:

(A) Live one-hour course -- programming and production costs -- from \$10,000 to \$70,000;

(B) Copied programs -- from \$1200 to 1500/hour (3).

The programming costs may seem high but even taking the high cost of \$70,000 and spreading it among 100,000 students gives a per student cost of 70¢; and if it is used for five years the cost drops to 14¢ per student per hour.

Research has found that ITV can teach all grade levels and subject matter about as effectively as TI (1). In the early studies, though, only the medium of instruction was changed. New methods of instruction using mixes of technology were implemented later and found to be much more effective.

It was decided that ITV programming would be implemented in kindergarten through 8th grade. This was done because students in the lower grades accepted ITV easier and there are about a million students in grades K-8 over which to spread the costs.

Computer Assisted Instruction (CAI)

Computer assisted instruction had been used very rarely prior to 1970, and then only in universities. CAI, like ITV, was first used as an "add-on" to traditional instruction. This did nothing to save money even though it did improve achievement (1). A report in 1975 which looked at fifteen examples of CAI approached the problems stated earlier in terms of instructional productivity (6). Instructional productivity was defined in terms of inputs, processes and outputs as follows:

- I. Inputs (added to regular instruction)
 - Computer programs
 - Data bases
 - Materials
 - Students
 - Tests

II. Processes (related to computer applications)

Analyze/relate data
 Evaluate responses
 Perform computations
 Prescribe activities
 Provide questions
 Test performance

III. Outputs (above regular instruction)

Cost avoidance
 Course content
 Student efficiency
 Test results

The report reached four conclusions:

- Growth of instructional computing has been justified as an added cost at the level of individual classes or courses without displacing labor or other costs.
- Instructional productivity can be identified at that level in qualitative and/or quantitative terms which show contributions of computer technology.
- Justification of instructional use of computers can be made in those terms by relating added inputs with the computing to added outputs due to the computing.
- The above approach offers promise for advancing instructional use of computer technology during the next 2-3 years and deserves the support of many more academicians documenting/ disseminating results (productivity) from using computers in their courses (6).

Here, as in other studies, CAI saved up to a third of the student's learning time as compared with TI, without a decrease in effectiveness. Another emphasis here, as elsewhere, was that this technological application augments human effort, increases the productivity of teachers, and does not replace them completely (1).

In a study done for the DOE in 1977 the computer capabilities of the school districts were studied (10). It was found that the districts were then spending approximately \$13,000,000 for data processing. The report recommended that the existing systems be upgraded and expanded so that every district would have equitable access to computer services. Further following the recommendations, eight regional data centers were established with full administration and instructional applications available to every district. The statewide system was allowed to evolve rather than have a monolithic structure forced from above. Thus, each individual district maintained its autonomy yet was able to come on-line as it saw and felt the need for the various services.

The many potentials for cost reduction put forth in another study were realized (11). These are as follows:

- Mainline CAI can cost less than \$1.00/student contact hour (SCH);
- A school system can share computer costs, e.g., administration, CAI, continuing education, adult education, city and county governments;
- Economy of scale can be reached through manipulation of number of terminals and/or average usage;
- Mass distribution of software can spread costs;
- Multiple use of programs is just as logical as multiple use of texts;
- Course development costs decrease as authors obtain experience with CAI;
- Software development as part of theses and dissertations is a source of cost reduction;
- With stable content areas, number of students (for assigning development costs, etc.) can be spread over several years;
- Superimposition of CAI on a computer installed for other purposes reduces the cost of CAI;
- Standardization of format promotes transfer of material;
- Networks and consortiums can spread costs (12).

We have found that large computers have the advantage of economics of scale, i.e., the larger the facility the smaller the per unit cost of production. A large computer does not take proportionally larger facilities and staff than a small one. The eight regional data centers were established in the state based on the 1977 study since larger computers can handle much larger workloads (10). These regional centers reduced the cost of phone lines to connect remote terminals with a central computer and enabled better service and response within a region. Access to computer terminals was made possible in each school to take advantage and make complete utilization of the regional data centers. Most of the start-up costs for the regional data centers could be attributed to administration purposes since the system was being implemented explicitly for that purpose (10). The instructional aspects were marginal costs since the system was simply expanded to accommodate that aspect.

Before going to the regional computer systems an adjunct system was first tried with business oriented computers. Here, the context was provided by the teacher with programming also provided by the teacher. It used the time sharing capabilities of computers and represented a

low-to-moderate "add-on" to the already existent capital investment. It did increase effectiveness by providing the opportunity and necessity for restructuring objectives and subject matter. This early system was teacher oriented and the programs were supplements to traditional instruction and/or served as new kinds of homework. The instructional uses were:

- Problem solving
- Simulation and modeling
- Drill and practice
- Remedial work
- Use of illustrations during lectures

Initially we found that products or programs were very localized and dissemination was therefore difficult.

The adjunct CAI program was useful for experimentation and introducing CAI to public schools but it did not represent a new approach, just a fancy "add-on". The regional computer center, on the other hand, represented a mainline approach where a complete redesign of the instructional system was required in conjunction with increased use of ITV. This mainline approach was designed from the first for major dissemination. The system was designed to deliver a substantial block of instruction so that the role of the teacher had to be redefined. The new role finds teachers relieved from making class presentations of basic material or of assigning and correcting drill and practice exercises commonly found in arithmetic, vocabulary development, grammar, and spelling.

To take advantage of time savings, lock-step scheduling was replaced by a self-paced, individualized scheduling system, with a criterion referenced standard for grading to replace grading "on the curve." For software development, a professional team was responsible for the design, documentation and distribution of the courses.

The new role of teacher is seen as tutor-advisor/diagnostician and problem solver. The new functions for a teacher include:

- Individual diagnosis of the requirements of each student
- Personalized curriculum prescription
- Motivation of students
- Facilitation of an individual student's learning activities
- Evaluation and feedback of each student's progress to assure continuous learning (7).

Teachers find that they are now able to function better as professionals and with the help of remedial programs are able to help the slow learner much more effectively.

Conclusion

The introduction of technological applications into the Florida school system over the past eight years has helped the state increase the quality of education as well as level off rising expenditures that threatened the system with bankruptcy. Continued monitoring of the system is required and intensive study made of the actual cost savings achieved through these technological applications. The full potential of the system remains to be realized as improvements are made every year.

Some curriculum diversity was initially lost as the new system was implemented and programs were being developed (11). Now, after eight years of experience with the system more diverse program offerings are available. In the near future, we expect to be able to provide a wider range of curricular alternatives than was ever possible under traditional instruction.

Florida now has one of the most advanced education systems in the nation. If readers wonder where Florida's education system would be if the traditional system had been maintained they are directed to Chapter 2 of this report.

The increased use of technological applications has helped Florida serve additional students, increase interest and competency for more students, overcome continually rising input prices, and create a less labor intensive but more efficient and effective education system.

REFERENCES

1. Jamison, D., Suppes, P., & Wells, S. The effectiveness of alternative instructional media: A survey. Review of Educational Research, 1974, 44(1), 1-67.
2. A survey of video-distribution systems for educational purposes. London: National Council for Educational Technology, 1973.
3. Bates, A. W. Educational and cost comparisons between open-network, cable and cassette systems of multi-media teaching. Paper presented at the 8th Mediorama for the Development of Industry and Labour, Blankenbeige, Belgium, May 1973.
4. The use of ITV in Georgia. Final Report to Georgia State Board of Education, 1975.
5. An overview of the TICCIT program. McLean, Va.: Mitre Corp., 1974.
6. Wiley, L. V. Jr. Computers and instructional productivity: A professional report. Bethesda, Maryland: IBM, 1975.
7. Swanson, A. D., & Willet, E. J. Updating the little red schoolhouse: Toward developing a pilot model of capital-intensive education to promote individualized instruction and stabilize educational costs. Educational Technology, Jan. 1977.
8. Public television station facilities (Report E7401). PBS Engineering and Technical Operations, July 1974.
9. Smith, D. D., & Hess, R. D. The effects of computer-assisted instruction on student self-concept, locus of control, and level of aspiration. Stanford Center for Research and Development in Teaching, 1972.
10. Klinger, D. M. A phase one plan for the equitable distribution of computing services to Florida school districts. Florida Department of Education, 1977.
11. Grayson, L. P. Instructional technology: On diversity in education. AV Communication Review, 1976, 24(2), 117-134.
12. Stakenas, R. G., & Kaufman, R. Costs and effectiveness of technological application in education: A literature review. Tallahassee: Florida Department of Education, January 1977. (STAR Project No. 76-2061)

THE EDITOR'S PAGE

BETTER SCHOOLS MAGAZINE, October 1986, Vol. 20, No. 10

Better Schools for Less Money: Can It Be Done?

Today many public school systems throughout the country are facing financial crises. They have failed to cope with the alarming problem of educational costs rising at a faster rate than the rest of the economy--a situation that has existed for the past ten years. This failure has resulted in the closing of many small schools and in the declaration of bankruptcy by some large systems. As a result, education has come to a virtual halt in many public school districts in the U.S. The situation has become so bleak that the President is urging the states to take emergency actions to remedy it and in doing so, he is directing them to the 1975-85 Florida Plan for educational improvement and cost reduction.

In response to the President's plea to take all

measures required to save our schools, Better Schools asked field reporter Nancy S. Mengel to investigate the Florida Story. In this issue, Ms. Mengel will relate the Florida Plan for K-12: Flexible Learning Programs. She will show how the state implemented the strategy of redesigning school systems to use low-cost technological processes and "little media" in individualized learning settings in its K-12 public school system in order to improve school learning programs and reduce costs at the same time. If it is not already too late, the Florida Plan described in these pages may contain solutions that can help other states solve the problem posed by providing education at costs that are growing at a more rapid rate than the growth of the tax revenues required to support education.

RGS

A COST REDUCTION PLAN: FLEXIBLE LEARNING PROGRAMS FOR THE ELEMENTARY AND SECONDARY SCHOOLS A SCENARIO

By Nancy S. Mengel, Field Reporter

THE PROBLEM IN FLORIDA IN 1976

In 1976 the Florida educational system was beset with a myriad of problems. Students, parents, and taxpayers were making demands for quality and efficiency in public elementary and secondary education. At the same time, parents, teachers, and school board members wanted more state money but less state control. The whole atmosphere was characterized by cries for increased productivity, back-to-the-basics, and home-rule in education. In response to this mood, the state legislature passed the Education Accountability Act of 1976. The law attempted to answer these demands for improved quality and greater efficiency by guaranteeing similar educational opportunities to all who enrolled in the public schools to acquire the minimum basic and survival skills and by requiring that schools be held accountable for outcomes and costs (1).*

With the passing of the Education Accountability Act of 1976, the state had made the commitment to achieve better schools and at the same time, it had placed itself in a seemingly impossible situation. For most people better schools meant providing more of the same: more of the same teachers, facilities, and materials. In essence, better schools meant spending more money. But for the state it also meant "financial

crisis." A review of the state's fiscal situation at that time will explain why.

In 1976 the demographic projections were that the state's population would grow on the average of 2.75% per year between 1976 and 1985 while the state's revenues would rise less than proportionately. Thus, Florida would see rising enrollments and increasing educational costs but at the same time, it would witness constant or declining revenue funds (2). This meant less money would be available to meet the demands for better schools. As a result, the state had two choices: provide more for less or face an unbalanced educational budget.

DECISION: PROVIDE MORE FOR LESS

In 1976, 71% of the state of Florida's general revenue expenditures for education went to the district schools and 81% of this district funding was for the basic school program (3). If the projections of the time were realized, 65% of the total general revenue expenditures for education would go to the district schools by 1985-86 and 75% of this district total would be for the basic school program. But if the legislature curtailed expenditures for education so that they did not exceed 61% of the total general revenue that they had accounted for

*Numbers in parenthesis () refer to references which document sources of quotations, the validity of projections, conclusions, and findings. A complete list of supporting documents may be found at the end of the scenario.

MYTHS ABOUT TECHNOLOGY

One of the most interesting discoveries made by Reporter Mengel in her investigation of the Florida Plan was the wide variety of perceptions which people hold toward "educational technology." Many people tend to view it as "things" such as computers, televisions, and audio/visual equipment. Professionals in the field, however, make careful distinctions between technology as a problem solving and design process, often referred to as "soft" technology, and the technological applications that are commonly associated with instructive hardware, usually referred to as "hard" technology (4).

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in 1976, a 31% reduction in projected general revenue expenditures for education would be necessary (3).^{*} Because the State Department of Education did not expect the legislature to increase the level of funding for K-12 education, it would have to find a way to help districts cope with reduced funds over the next ten year period. As a result, the Department of Education made two decisions. One was to try to achieve better schools for less money and the other was to accomplish this primarily by focusing on the largest cost area for the state -- instructional costs for the basic school program (3).^{**}

The Strategy Planning Staff of the Florida Department of Education initiated this mission by conducting a needs assessment to identify the exact nature of and possible solutions to their problems. Their work centered around challenging two myths about educational effectiveness:

- Students have to spend 180 days a year, 5 days a week from 9-3 daily for thirteen years to achieve minimum performance standards required of a high school graduate.
- Providing more of the same will make a significant difference in education.

As a result of a needs assessment, they concluded that it might be possible to provide better schools for less money if various low-cost technological processes and applications were used in individualized learning settings that incorporated the most cost-effective mix of the following developments in education: competency-based education, school-based management, team teaching or differentiated staffing, non-graded schools, and extended school year programs. In other words, educational planners in Florida believed that

^{*}If general expenditures for education could be stabilized so as not to exceed 61% of the total general revenue in 1985-86, expenditures for the basic program would have to be 4.2% less in real 1976 dollars than in 1974-75.

^{**}Federal legislation requiring states to extend their programs in other areas such as exceptional and vocational education precluded the possibility of greatly curtailing other expenditures. Such an undertaking would be too risky because of the possibility of losing federal funds for those programs (3).

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Another perception which was widely encountered is that technology is dehumanizing. Again, professionals in the field see this as a misconception and point out that humans make the decision to design technological applications which result in dehumanization. They assert that dehumanization is not an intrinsic feature of technology unless designers and decision makers choose to make it that way. Florida's decision makers chose to design individualized, accountable learning programs through the use of "little media." Their selection of "little media" was based on the results of a needs assessment which revealed that low-cost, simple to implement, humanistic programs could be developed using PI and easily transportable audio-visual equipment (as opposed to "big media" such as computers and television which can reach large audiences but are more expensive and more difficult to implement).

recent developments in the organization and management of instruction could be adapted to each school district's unique situation in order to solve the problem of maintaining or increasing effectiveness in the basic program with less money. These

developments caught the attention of the Florida educators because they not only provided possible solutions to their financial problems, but they also provided answers to the demands for increased productivity, back-to-the-basics, and home-rule as well.

MYTHS ABOUT EDUCATIONAL EFFECTIVENESS

Another obstacle to effecting cost-saving change in education is the fallacious belief held by so many people that equates small classes with quality education (5). As long as education remains a labor-intensive enterprise, it will never be as productive as other sectors of the economy and in turn, the taxpayers will tend to be dissatisfied with the level of output. In addition, as long as people cling tenaciously to the agrarian school year of 180 days and summer vacations, the time-savings and therefore the cost-savings that could be realized by achieving student acceleration through the use of technological applications such as PI and CAI will never occur. Although none of the research has shown that acceleration is harmful to children (6), state legislatures are still unwilling to pass laws that would allow for flexible scheduling. Until this flexibility becomes reality, education will lag far behind other segments of the economy in terms of efficiency and productivity.

THE FLORIDA PLAN

The Florida Plan does not provide a prescription for the financially debt-ridden school system. It may not even offer a model that can be imitated by other states that are facing financial crises. What it does offer is a set of recommendations on ways to manipulate recent developments in the organization and management of education so that local school districts can satisfy local needs, meet minimum state performance standards in the basic program and balance curtailed state funds and local expenditures simultaneously.

HOW IT WORKS

Reduced Funding for Basic Programs

In 1976, the Department of Education (DOE) projected that future cutbacks in state expenditures for education would primarily affect instructional costs for the basic school program. The DOE also anticipated that the custodial function of the public schools would be reduced. For planning purposes, they had made the following assumptions:

1. Funding for the basic program in 1985-86 would be reduced by the amount that could be saved in general revenue expenditures for education if the statewide pupil-teacher ratio were doubled. One way of accomplishing this could be to refrain from replacing teachers who quit or retired.*
2. Kindergarten and twelfth grade could be eliminated without adversely affecting the achievement levels of students.

By 1978 the DOE's projections were becoming reality. By gradually increasing pupil-teacher ratios through faculty attrition and by shortening the K-12 program to a 1-11 program, the state expected general revenue expenditures for education in 1985-86 to be reduced by 30% in 1976 constant dollars (7). But the state also expected to achieve better schools at the same time. The fact that it did can be attributed to the DOE's foresight, good planning, and quick action in assuming a leadership role in effecting adaptive change.

HELPING THE SCHOOLS ADJUST

Essentially what the state of Florida had done was to say to the schools, "We are giving you less money while expecting you to improve your basic school program so that students can meet the minimum performance requirements established by the Educational Accountability Act. Now do the best you can in achieving better schools for less money." In one sense, the districts were happy because it was a victory for home-rule. But in another sense, they were very apprehensive because it could mean a loss in effectiveness for local public education. All the state would have to do would be to adopt a hands-off policy such as: "You want home-rule. Good, you are on your own now." This would leave each district to its own means for achieving the mandated ends. Such a task would have been an impossible one for many local schools. Fortunately, the State Legislature did not leave the districts without assistance and support. Instead the DOE, under the Legislature's direction, took the lead in preventing disaster by developing a comprehensive cost-reduction plan that would help each

*The attrition rate of 6,000 teachers a year would produce the amount of savings in instructional costs that would be required by 1985-86 (7).

school system develop an optimum learning program for meeting its needs with reduced funds.

THE FLORIDA COMPREHENSIVE COST-REDUCTION PLAN FOR DEVELOPING FLEXIBLE LEARNING PROGRAMS IN THE ELEMENTARY AND SECONDARY SCHOOLS

Each district was provided with technical assistance and guidelines for developing flexible learning programs in its schools. The main features of this comprehensive cost-reduction plan are outlined below.

- Assess Learner Needs

Each school district conducted a needs assessment and developed district goals and objectives for a competency-based program which would meet minimum state performance standards in the basic skills and local needs for functional and survival skills.

- Develop a School-Based Management System

Each district developed a plan for evaluating the new programs effectiveness and for relating costs to learning outcomes.

- Take an Inventory of School Resources

Each school district took an inventory of its materials, facilities, and staff competencies to determine how they could be used to achieve an optimum flexible learning program.

- Develop an Optimum Flexible Learning Program

Each district, with expert assistance from the DOE, developed an optimum flexible learning program for each of its

schools. This program had to incorporate the most cost-effective mix of the recent developments in education listed on page 2 in order to achieve an individualized system of instruction that would cost no more than the basic programs of 1975 that were taught in the traditional teacher-centered mode. The learning program had to be developed using existing materials, facilities, and staff.

- Conduct a Pilot Project

A pilot project was conducted in an elementary school and in a high school in each district for one year prior to installing the plan on a district-wide basis.

- Install the Plan Throughout the District

Revisions were made based on the evaluation and feedback from the pilot project and the plan was installed in all schools in the district.

MAIN FEATURES OF THE FLEXIBLE LEARNING PROGRAMS

In order to meet the Legislature's demand for better schools for less money by 1985-86, each district had to reorganize its schools. The first step taken toward achieving this goal was to increase pupil-teacher ratios by individualizing instruction using programmed instruction and inexpensive media to develop learning programs that could be managed by teams of teachers or differentiated staffs. The adjustment to larger pupil-teacher ratios was facilitated by adopting various cost-effective mixes of non-graded learning programs, extended school year schedules, and/or half-day sessions. Finally, each district developed competency-based programs and school-based management systems

in order to ensure that each school could be held accountable for learning outcomes and costs.

FEATURES COMMON TO ALL FLEXIBLE LEARNING PROGRAMS

After conducting a study of the programs that were developed in each of Florida's sixty-seven school districts, Reporter Mengel discovered that they all had to incorporate some form of the following in order to achieve better schools for less money: individualized instruction, learning centers, competency-based programs, and school-based management systems. Descriptions of these essential components of the flexible learning programs are provided below.

Individualized Instruction

In an individualized instructional system, the student works at his or her own pace. A larger measure of responsibility is placed on the student for self-direction for his or her learning experiences (8). In the Florida schools each student's individualized learning program consists of the following:

- Mastery requirements for the basic skills
- No mastery requirements for transfer of learning activities
- Assessment tests to determine mastery of basic skills
- Diagnostic tests to determine what skills have not been learned or have been forgotten
- Learning prescriptions based on assessment and diagnostic test results (9).

In Florida's individualized instructional programs, the teacher is the manager of the learning experience. He or she uses diagnostic test results to develop the required learning prescriptions for each student.

These prescriptions indicate the "course of action" the student should follow in his or her learning program. As a manager of the learning experience, the teacher uses the prescription to direct the student to a learning activity which could consist of any of the following applications of low-cost "little media": programmed instruction, print modules, audio-tutorials, video-tutorials, and learning activity packets. Through the use of diagnostic testing and learning prescriptions in individualized learning programs, each student is permitted to proceed at his or her own rate in order to achieve the basic, functional, and survival skills.

Learning Centers

Since individualized instruction does not require the teacher-oriented mode of delivery, the traditional classroom is no longer a suitable facility for learning activities. Thus, each school had to adapt its facilities to the requirements of the new system. This was accomplished by installing learning centers in classrooms and by transforming libraries into learning centers. A learning center can be either a separate room or a screened off section of a classroom. It usually consists of tables, study carrels, and any required mix of the following "little media" applications: sound projector, filmstrip/slide projector, opaque projector, record player, headsets, projector screen, video-tape recorder, cassette tapes, video tapes, bulletin boards, filmstrip viewer, books, magazines, and three-dimensional objects (10).

Competency-Based Programs

In order to ensure that students met minimum state performance standards, each district designed com-

petency-based learning programs. These programs consisted of explicit statements of performance objectives that were derived from assessment of learner needs and minimum state performance requirements and goals. Techniques were designed for achieving the objectives which included the most cost-effective mixes of the main features of the Flexible Learning Programs that were outlined on page 5. Evaluation measures such as the diagnostic and assessment tests described in the section on individualized instruction were designed to determine the learning needs of students for both individual and group learning experiences (11). Since all of the districts designed and implemented competency-based learning programs, an objective accountability system became a reality.

School-Based Program Management Systems

If each district was to achieve better schools for less money, a method had to be devised for relating costs to learning outcomes. The state accomplished this by having each school develop a school-based program management system which provided each school with a systematic planning and management tool. This tool employed the following procedures to accomplish the goal of relating program costs to learning outcomes and revising accordingly.

1. Needs Assessment
2. Program Planning -- selecting alternatives to meet needs and effect change.
3. Process Monitoring -- making sure the program is implemented correctly.
4. Product Monitoring -- assessing student achievement.
5. Outcome Evaluation -- summative evaluation which relates costs to outcomes (12).
6. Revise as Required.

School-based program management served as a method for monitoring the installation and progress of each flexible learning program and provided the tools for evaluating their results and revising as required. By using this management system, Florida was able to achieve cost-effective learning programs in the public schools throughout the state.

FEATURES UNIQUE TO SOME DISTRICTS

Some of the Florida public schools chose to reorganize their grade structures, staffing patterns, and school year schedules in order to develop flexible learning programs with higher pupil-teacher ratios. A number of schools developed nongraded programs that permit self-paced acceleration. Ability cluster groupings have been organized for grades 1-3 and 4-6 (9) with acceleration in grades 1-6 depending upon the mastery of learning units required in each cluster level. Acceleration in grades 7-11 is dependent upon mastery of the required number of basic skills and a specified number of elective courses (13). The nongraded programs permit all students in these particular school systems to progress through the 1-11 program while maintaining, and in many cases, increasing student achievement.

Various new staffing patterns and school year schedules were devised to facilitate adjustment to the higher pupil-teacher ratios. Some districts chose to go on half-day sessions while others developed extended school year programs to use facilities and personnel more intensively. Other districts redesigned their staffing patterns and salary schedules to reduce instructional costs. They did this by developing team teaching and/or differentiated staffing.

In team teaching, teachers have been organized into "teams" which share the responsibilities of teaching one group of students. Each team consists of a teacher from each of the four basic subjects and a paraprofessional aide. One team is responsible for a group of 200-300 students. The learning program for this group involves a mixture of learning center lessons and classroom lessons. While the English and social studies teachers are working with a group of fifty to seventy students in a traditional classroom setting, the other teachers can be managing individualized activities in the learning centers. Thus, team teaching combined with low-cost instructional media has offered one solution to the problems posed by higher student-teacher ratios.

Some districts solved pupil-teacher ratio problems by extending the concept of team teaching to the development of differentiated staffs. These districts felt that greater cost savings could be realized if school staffs were restructured to differentiate teachers by the tasks and functions they perform rather than by grade level or subject. Then, teachers could be remunerated according to the difficulty of their tasks and the amount of responsibility of their positions. Through the use of flexible scheduling and grouping, different members of the staff would perform different functions, and they would be paid accordingly. Routine clerical tasks could be performed by aides, and learning center activities could be monitored by paraprofessionals. By reorganizing staffing patterns, restructuring salary schedules, and developing flexible cost-effective learning programs, it has become possible for some districts to reduce instructional costs without greatly decreasing the number of instructional personnel or student achievement (14,15).

NEW ROLES FOR TEACHERS

The use of technology as both process and application requires that the Florida teacher play new roles. He or she is now an instructional designer, learning manager, and/or learning evaluator. Reporter Mengel from Better Schools visited with educators in districts throughout the state to find out what their reactions are to the new roles of the teacher in Florida. The following comments summarize what she learned.

INTERVIEWER: School districts in Florida have redesigned their learning programs to include a great deal of individualized instruction. Are there any advantages for the teacher as compared to traditional instruction?

JR. HIGH SCHOOL TEAM TEACHER: Individualized learning programs have freed me from the responsibilities of teaching many of the routine, basic skills. I no longer control the students' rate or method of learning. Instead, I serve as a manager and a guide in the learning process. I have more time to devote to individual students who need my help and in this sense, individualized instruction is more satisfying. Yet, I miss some of the large group interaction of the traditional class.

SARASOTA COUNTY HIGH SCHOOL TEACHER: A successful system of individualized instruction would be impossible in our school without differentiated staffing. Most teachers would not be able to devote the time required to design programmed instruction modules or other independent study learning packets. In addition, very few trained professionals would want to monitor students' activities in the learning centers. Differentiated staffing allows each teacher to perform the teaching tasks he or she is most interested in and is most capable of performing. Those who want to teach, design instruction, and work on staff development can aspire for

the higher paying, more demanding positions while those who want to limit their responsibilities to just teaching can assume the positions that require the performance of instructional functions only. If our school had not reorganized the staff along these lines, teacher resistance to converting to individualized learning programs could not have been overcome. The fact that teachers could choose the level of responsibility they were willing to assume made the plan more agreeable. But it was still hard for some to accept having less pay for less responsibility.

INTERVIEWER: You said that teachers who assume the more demanding positions will receive higher pay. Isn't this really merit pay in disguise?

SARASOTA COUNTY HIGH SCHOOL TEACHER: No. The salary a teacher receives under our differentiated staffing plan is based upon the amount and nature of the responsibilities associated with the job. It is not based on the evaluation of a teacher's effectiveness or achievement. If the latter were the case, teachers would never have been willing to give up the old salary schedules that provided for the same pay increases for all teachers as they accumulated years of experience.

DADE COUNTY ELEMENTARY SCHOOL TEACHER: The teacher is no longer expected to be a jack-of-all-trades. Just as we are individualizing our learning programs for our students, we as educators are finally willing to face the fact that not only do our students have different capabilities and interests, but we as teachers do also. By differentiating our staff, we are giving teachers the opportunity to pursue their areas of special interest and ability and to achieve professional growth and movement up the career ladder based on assumption of greater responsibility. The only

potential problem with this is that, like the medical profession, we may be facing overspecialization. Since responsibilities are more narrowly defined under the new staffing pattern, actions are too. No longer does a teacher have to serve as scholar, tutor, child psychologist, counselor, and helpful friend. In the long run, this may not be good for students. It is too early to tell at this point.

INTERVIEWER: One of the outcomes of individualized learning programs is that greater use is made of instructional media in the delivery of instruction. Do you feel that such technological applications will replace the teacher?

JR. HIGH SCHOOL TEACHER: No. Actually technology is creating more jobs for many different kinds of teachers, instructional designers, media specialists, and paraprofessionals. I think technology is making the teacher more effective. Now, the teacher is equipped with the tools required of a good system of accountability, and as a result, technology has become a source of support rather than a threat. We don't see how we could have handled the large increases in class size without assistance from educational technology.

INTERVIEWER: You mentioned accountability. How do teachers feel about being held accountable for their students' learning outcomes?

JR. HIGH SCHOOL TEACHER: Under the old system, accountability was not a threatening word because there was no way of singling the teacher out for the blame. Under this new system, the teacher is responsible and can be held accountable. The system has been redesigned to incorporate accountability features such as competency-based learning programs, school-based management, and differentiated staffing. The teacher has the required tools and training to effec-

tively fulfill his or her responsibilities so accountability has become merely a matter of doing the job right or making sure students achieve the desired outcomes. This is expected of anybody in any profession.

INTERVIEWER: Would you say that the role of the teacher is more satisfying than it was in the traditional classroom?

ELEMENTARY SCHOOL TEACHER: I miss the teacher-directed classes and the variety of tasks I performed each day. My old classes were often more interesting, but they were also more tiring. I can honestly say that I feel more competent and self-filled in my job now. The new system is more conducive to providing opportunities for professional growth and satisfying daily experiences in helping students learn.

Parent and Student Reactions to the New System

Reporter Mengel visited with a number of families throughout the state to find out how parents and students are reacting to the flexible learning programs. The following comments summarize what she learned.

INTERVIEWER: Do you feel the teacher is doing too little in the individualized learning programs?

PARENT: I don't think so. Before the teacher had to do too much talking. Kids were never given a chance to learn anything on their own. Now they have to assume more responsibility for their education. This should help make it easier for them to assume adult responsibilities when they get out of school. Instead of being coddled and spoon-fed for eleven years, kids are now being provided the opportunity to simulate the tasks of the various roles they will play when they get out of school. In my opinion, this is the way it should be.

HIGH SCHOOL STUDENT: The teacher does less teaching in class and the student does more learning. The new system is more demanding and harder on the student. Sometimes I have trouble disciplining myself enough to get my work done. But once I have finished it, I feel a sense of accomplishment, and I feel like I really learned something. All in all, I guess I am better off learning this way than I was in the traditional classroom where the students tended to wait to be told what to do by the teacher.

INTERVIEWER: How do you feel about the elimination of kindergarten and twelfth grade?

PARENT: Twelfth grade is just a repetition of past learning for most students. For the college student, it is just a forerunner of what he will learn in his freshman and sophomore years at college. It is no major loss especially with the new nongraded features in the school which allow for flexible acceleration schedules.

PARENT: I am a mother who has always worked and sent my children to day care centers and nursery schools. An extra year in nursery school won't make any difference for the child, but it will cost the parent more. Yet, eliminating kindergarten was a better choice for saving money than shortening the school year or going on half-day sessions. If these actions had been taken in our district, I would have to pay for child care for more than one extra year. It is simply cheaper for me to have my kids in school all day.

PARENT: I agree that the elimination of kindergarten and twelfth grade were better than choices such as year-round schooling which were made by other districts. I like to take my vacation in the summer and have my family go with me. As far as I am concerned, a child's summer vacation is just as important to his growth and education as school, if not more so.

INTERVIEWER: How do you feel about large classes?

JR. HIGH SCHOOL STUDENT: I don't even notice it. I spend a lot of time in the learning center with many other kids, but there are enough adults around to help so that I feel like I see more of my teachers rather than less. Being with a large group of kids in a learning center is different from being with a large group in an old classroom. It just doesn't seem like there are that many other kids around.

PARENT: I have to see what the final outcome of all of this is for my children. I always thought that small classes meant more effective education. Whenever our classes got too large, the teachers never seemed to be able to handle the kids or help them when they were having trouble. Yet, since the schools have been reorganized to accommodate larger groups, surprisingly, the problems are not as great. I guess that taking everything into consideration, small classes aren't that important after all, but it will take some time before we know this for a fact.

INTERVIEWER: I guess what really counts is that your children are learning in ways that are not a drain on your pocketbook.

PARENT: I agree. Who can complain if the schools are better and cost less?

THE FLORIDA PLAN FOR LOWERING EDUCATIONAL COSTS

The variety of learning programs that have been developed throughout the state have much to offer in the

way of cost reduction. Since each district developed its own optimum learning program to meet the needs of students and the requirements of a reduced budget, education in the State of Florida prevented the occurrence of a financial crisis. The state can attribute this success to the fact that it made the commitment back in 1976 to deal with the realities in a flexible manner. The state did not mandate the reforms each local school system would have to make to achieve better schools for less money. Instead, the state accepted the principle of home-rule and assisted its local school districts in developing optimum flexible learning programs. In doing this it made sure that local planners were guided by reality and not by myth. The state increased the range of alternative solutions open to the districts by eliminating local requirements to maintain kindergarten and twelfth grade and by encouraging the stabilization or reduction of teaching staffs. As a result of these two actions, local educators were liberated from the constraints of trying to achieve educational improvement while accepting the myths stated on page 2 as facts. The final outcome was that the districts converted their educational systems to more capital-intensive learning programs which promoted individualization, accountability, and home-rule and stabilized educational costs at the same time. The latter occurred because the new programs resulted in a doubling of the statewide pupil-teacher ratio and curtailment of general revenue expenditures for education to less than 61% of the total general revenue in 1985 (7). With a 31% reduction in projected general revenue expenditures for education, sufficient savings were realized to compensate for the initial add-on costs for paraprofessionals and software and hardware applications in many district schools.

SPECULATION OR FORESIGHT AND SOUND PLANNING?

It may appear that Florida was taking a stab in the dark when it made the decision to achieve better schools for less money. Yet, there was very little speculation involved. Sufficient evidence was available in the research literature on cost-effective innovations, programs, and practices to lead Florida educators to believe that a flexible approach to developing optimum, cost-effective program "mixes" could lead to good results. Examples of such research are given below.

Blaschke and Sweeney (1977) describe a cost-effective technological program that took place in Dade County Florida in which an increase in class size from 25 to 40 more than offset the cost of purchasing and implementing a new technology-based instructional program (16).

Swanson and Willett (1977) developed a pilot model of capital intensive education which incorporates individualized instruction, learning centers, and differentiated staffing. This model appeared to be more effective and efficient than the traditional model of schooling. The highest estimated costs of the model was exceeded in 75% of the traditional districts in Western New York State in 1972 (17).

Gagné (1971) describes an optimum system of elementary education that has been developed to cost no more than traditional instruction. The system consists of a partially ungraded school, individualized instruction, student tutoring, and parental involvement. He describes a method called Linear Programming that can be used to determine the appropriate staffing pattern for implementing a school's instructional program effectively at a minimal cost (9).

Krumbein describes a model for financing a differentiated staffing project that uses paraprofessionals to the extent that the savings not only paid for the innovation, additional materials, and resources, but also started the school system well down the road to differentiation (18).

Finally, Kincaid reviewed the literature on the cost-effective applications of technology in the public elementary and secondary schools and concluded: "With present knowledge and organizational patterns of public education, even a zero-cost media system with no classroom or operating personnel might save a school system at most 11% of the total budget, and current uses of technology would save considerably less, if anything at all. As long as student time in schools is fixed independent of learning, other less-capital intensive means of reducing costs, such as differentiated staffing and year-round schooling, appear more attractive than technology" (19, p. XI).

NO CHOICE BUT TO INCREASE PUPIL-TEACHER RATIOS

Florida educators realized that the only way they could achieve significant savings was to cut back on instructional costs for the basic skills areas. This meant cutting back on funds for teachers salaries (2,20). The problem was to do this in the most cost-effective way possible without having to resort to large teacher lay-offs. Thus, the only alternative was to refrain from hiring teachers as existing faculty quit or retired, increase class size accordingly, and make greater use of paraprofessionals and aides.

Some schools did not have sufficient resources to implement an effective program of individualization, so they had to resort to half-day sessions and/or teacher cut-backs to solve the problem of reduced funding from the state. But most school systems were able to achieve their goals by designing their own models of team teaching or differentiated staffing and by utilizing existing staff and resources to implement the new individualized, learning programs. Also, since the new programs utilized various forms of programmed instruction, there was no problem in achieving the same level of effectiveness in the eleven year school program that was previously achieved in the thirteen year program. This is due to the fact that programmed instruction is just as effective as traditional instruction and takes the learner 1/3 less time (4, 5). The post-secondary system was redesigned to accommodate the early high school graduates. The anticipated final outcome is that schooling from first grade through college will take three years less time which will result in future additional savings for the state.

A SUCCESS: THE STATE TAKES THE LEAD

The 1-11 plan outlined in the previous pages could never have been realized if the state DOE had not played the role of leader in the whole change process. Without the DOE's support and technical assistance, the district schools would never have been able to successfully design and implement the plan to achieve better schools for less money. The final success can be attributed to the following:

- The State Legislature and DOE served as sources of external pressure which helped school districts overcome organizational inertia. This pressure took various forms: Accountability Act of 1976, state assessment programs, curtailed funds for the basic school programs, the comprehensive cost reduction plan, and installation of systems of school-based management (21).
- The DOE provided sufficient training and technical assistance for the staffs in the district. This was easier to achieve than it would have been in most other states since Florida already had developed a sophisticated mechanism for providing in-service training prior to 1976: the Teacher Center (21).
- Information about educational programs and practices had been catalogued by the Florida Resources in Educational Exchange. It was easily accessible. All one had to do was make a toll free phone call to the DOE (21,22).
- A mechanism for linking school-based problems to relevant and validated R & D outcomes was provided by the Florida Linkage System. The initial installation

of the FLS in the schools occurred in the late 70's. Now it operates as a fully developed and effective problem solving/knowledge utilization process in all districts in Florida. As a result of this innovation, Florida schools are functioning at a much higher level with respect to problem solving and self-renewing capabilities. Thus, effective widespread reform was easier to achieve (21,23).

Florida has traditionally played the role of a leader in the testing of new innovations, programs, and practices in education. If the state had not already developed the planning capability, exerted external pressure, and provided assistance, the possibility for effecting school improvement in the face of a financial crunch would have been small (21).

PROBLEMS IN TRANSITION

Florida was and still is facing many problems. Not all school systems were willing or able to adapt the use of little media and individualized instruction to their learning programs. In some areas, small schools had to shut down because they just could not afford to operate. The cost of staying open proved to be greater than having a nearby larger facility absorb the small school's student body. Still other schools had to resort to half-day sessions or year-round schooling to absorb the increase and still maintain cost-effective learning programs.

In some districts, faculty resistance to developing a system of differentiated staffing utilizing existing personnel and paraprofessionals was so great that the teachers were willing to accept cut-backs in pay as an alternative. Some rural areas did not have sufficient staff

or student body to individualize greatly and they wanted to replace retiring teachers, so they had to resort to the less cost-effective solution of going on half-day sessions. Parent resistance to half-day sessions and year-round schooling has been great and has not been dealt with successfully by local or state officials. Parents do not want the school to give up its custodial function and they also do not want to give up family summer vacations. As a result, lobbyists are presently urging passage of a bill that would mandate the 180 day, five days a week, 9-3 daily, September to June school year.

The cost-saving plan was not an overnight success. In some districts, add-on costs for new technological applications had to be prorated over a period of 5-8 years before savings were realized at the local level. Other districts were able to compensate for these add-on costs by almost doubling class-size immediately which resulted in a lowering of the per pupil cost for a variety of instructional programs. Thus, costs were lower than they were for the same programs delivered in traditional classroom instruction.

Parents were not easily convinced that large classes could be just as effective as small ones. In fact, it has only been within the past year that the demand for a law that would limit teacher-pupil ratios to 1 to 35 has greatly subsided. Fortunately, the Commissioner's Annual Report for the past two years speaks for the success of the new system. People are getting more for less so they have less desire to complain.

CONCLUDING REMARKS

The Florida Department of Education has played a vital role in assisting local schools to reorganize and redesign their programs. In order to learn about the DOE's plans for the future, Reporter Mengel visited with the Commissioner of Education. In his concluding remarks he described Florida's goals for the next decade.

THE COMMISSIONER SPEAKS ABOUT THE FUTURE

"Florida still faces many problems in its educational system. Our schools are still time-bound and do not offer individualized learning programs in the sense that they fulfill each learner's interests and needs. We are still bound too much to out-dated curriculums that have

little relevancy to what it takes to survive, contribute and function as self-actualizing human beings in the real world. We should be developing more flexible instructional organizations--schools whose reasons for existence are for learners and not for parents and teachers. Florida has come a long way in improving its means for achieving its educational goals. Now we have to redirect our attention away from how to achieve these goals. We should be looking at the goals themselves and asking the questions 'What are the desired outcomes of education? What do we want our learners to be able to do as a result of having spent eleven years in school?' Unless we are willing to continuously view education in outcome-oriented rather than method-oriented terms, the prospects for future school improvement are dim"(21).

REFERENCES

1. Educational Accountability Act of 1976, Florida Statutes, Section 229.55.
2. Hewitt, C. Analysis of general tax revenues and cost increases in Florida education by 1985. Tallahassee: Instructional Systems Development Center, Florida State University, May 1977. (STAR Project No. 76-2061).
3. Department of Education, State of Florida. Analysis of projected enrollments, expenditures, and revenues for public education in Florida, 1974-75 through 1985-86. Tallahassee: State of Florida, July 1976.
4. Stakenas, R. G. & Kaufman, R. Costs and effectiveness of technological application in education. Tallahassee: Florida Department of Department of Education, January 1977. (STAR Project No. 76-2061).
5. Jamison, D., Suppes, P., & Wells, S. The effectiveness of alternative instructional media: A survey. Review of Educational Research, 1974, 44(1), 1-68.
6. Department of Education, State of Florida. Extended school year project: Interim progress report (Vol. 1). Tallahassee: State of Florida, March 1973.
7. Hewitt, Craig. Personal Interview. June 1977.
8. Morgan, R. M., & Chadwick, C. B. Systems analysis for educational change: The Republic of Korea. Final report. Tallahassee: Department of Educational Research, Florida State University, April 1971.
9. Gagné, R. Collected reports. Optimized system of elementary education. Tallahassee: College of Education, Florida State University, 1971.
10. Glasser, J. T. The elementary school learning center for independent study. West Nyack, N.Y.: Parker Publishing Co., Inc., 1971.
11. Frinks, M. Focus on competency-based education systems. In F.W. English & D.K. Sharpes (Eds.), Strategies for differentiated staffing. Berkeley, Calif.: McCutchan Publishing Co., 1972.
12. Department of Education, State of Florida. School-based program management system. Tallahassee: Division of Elementary & Secondary Education, Florida Education Research & Development Program, November 1974.
13. McClain, J. D. Year-round education: Economic, educational, & sociological factors. Berkeley, Calif.: McCutchan Publishing Corp., 1973.

14. Fiorino, A. J. Differentiated staffing: A flexible instructional organization. New York: Harper & Row Publishers, 1972.
15. English, F. W., & Sharpes, D. K. (Eds.). Strategies for differentiated staffing. Berkeley, Calif.: McCutchan Publishing Co., 1972.
16. Blaschke, C. & Sweeney, J. Implementing cost-effective educational technology: Some reflections. Educational Technology, 17(1), 13-18.
17. Swanson, A. D. & Willett, E. J. Updating the little red schoolhouse: Toward developing a pilot model of capital-intensive education to promote individualized instruction and stabilize educational costs. Educational Technology, 17(1), 27-32.
18. Krumbein, G. A model for the financing of a differentiated staffing program. In F. W. English & D. K. Sharpes (Eds.), Strategies for differentiated staffing. Berkeley, Calif.: McCutchan Publishing Co., 1972.
19. Kincaid, H. V. and others. Technology in public elementary and secondary education: A policy analysis perspective. Menlo Park, Calif.: Stanford Research Institute, April 1974.
20. Tickton, S. G., & Kohn, S. D. The new instructional technologies: Are they worth it? Washington, D. C.: Academy for Educational Development, Inc. President's Commission on School Finance, September 1971. (ERIC Reproduction No. ED 058498).
21. Temkin, S., McCann, R., & Connolly, J. An assessment of the prospects for widespread school improvement. Educational Technology, 1977, 17(1), 7-13.
22. Kuhn, M. Project Free (Interview) Tallahassee: Office of Dissemination/ Diffusion, State of Florida, May 1977.
23. Department of Education, State of Florida. Florida R & D Utilization Proposal to NIE, RFP No. 76-006. Tallahassee: State of Florida, February 1976.

Chapter 5

A HISTORY OF INSTRUCTIONAL TECHNOLOGY AND ITS IMPLICATIONS FOR EMERGING TECHNOLOGICAL APPLICATIONS IN EDUCATION: A SCENARIO

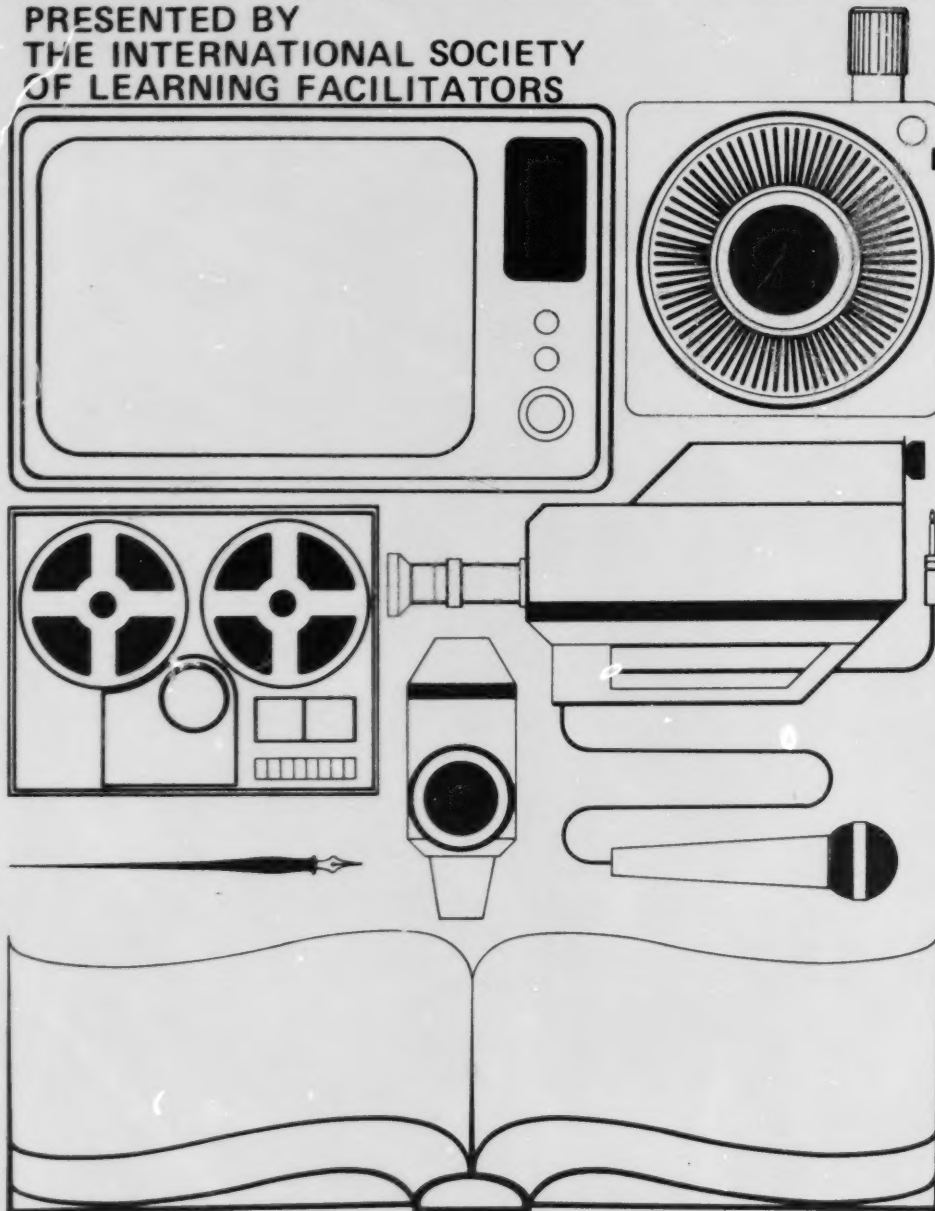
by

Ethlyn A. Garlich

Time : 1990

The scene of this scenario is a World Exposition. "Vistors" will be guided on a vicarious tour of historical exhibits dealing with technological applications: from ancient Greece to the present. Following his/her tour, each "visitor" will be directed to a report which uses this historical experience and perspective to analyze the causes of success and failure in applying technology to education.

**THE HISTORY OF TECHNOLOGICAL APPLICATIONS
PRESENTED BY
THE INTERNATIONAL SOCIETY
OF LEARNING FACILITATORS**



VARIOUS MEDIA/ PAST AND PRESENT

TECHNICAL EXHIBITION HALL

JUNE 15 thru AUGUST 31/1990

**AVAILABLE AT HOSPITALITY CENTER
VARIABLE SPEED AUDIO-TAPE LECTURE TOUR
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NO HOLOGRAPHIC PHOTOGRAPHY PERMITTED**

TIME: 1990 AD

PLACE: An exotic city at the
crossroads of the world

Picture yourself as a visitor to a World Exposition. The nations of the world have collaborated to create a series of pavilions and exhibits to depict what is unique and valuable about their history and their social and economic development.

Having just arrived on the grounds, you find yourself in search of something to see. What's this? Why it's a pavilion dedicated to technological developments--past, present, and future. There are exhibits describing progress in communications technology, space travel, terrestrial transportation, energy conversion, and automated manufacturing. The one which catches your eye, however, is an exhibit on instructional technology.

You move closer to see if it will be worth the time and effort to peruse the individual exhibits. As you walk into an entrance foyer, you hear an announcement

Welcome to the 1990 World Exposition. This series of exhibits on the history of instructional technology is sponsored by the International Society of Learning Facilitators. Each setting has been selected to portray specific developments in instructional technology. We at the Society hope you enjoy your personalized tour through the history of instructional technology.

Before starting your tour, we suggest you take a few moments to familiarize yourself with the operation of the Variable Speed Audiotape Recorder (VARSAAR). The VARSAAR is designed to play back at the speed you prefer without distortion. You may want to tryout varying speeds on the trial section before continuing.

THIS IS THE TRIAL SECTION. "The success of the Curmudgeon Affair as with most endeavors is dependent upon many factors. These factors include personality, perseverance, intelligence, and measure of luck." How was that speed? Do you want to try another? To continue? END OF TRIAL SECTION.

The following exhibits depict the history of instructional technology. The organization of the exhibits is by two main eras: pre-twentieth century and twentieth century. Within each era, displays will not be chronologically oriented but will focus on particular technologies.

In order to keep the sound track in synchronization with the exhibits, it is essential that you turn off the play back unit as you move between them. At this time, you should proceed to the pre-twentieth century hall.

PRE-20TH CENTURY TECHNOLOGICAL APPLICATIONS

As you enter the Pre-20th century exhibit hall, notice that there are three sections: the record of Knowledge, teacher illustration and demonstration, and student practice.

Proceed to Exhibit 1

RECORD OF KNOWLEDGE

1

In earliest times, the only record of knowledge was the oral tradition. However, the Greeks pioneered use of a written record (circa 400 B.C.). This practice met with severe objections from scholars who felt that the oral tradition was fundamental to proper education (1).^{*} Nonetheless, the written record was adopted.

The next major development in the record of Knowledge was the printed record. The year 1452 stands out as the date when the first book, the Bible, was printed. The difficulty in development, diffusion, and adoption of this innovation for education can be seen in the fact that books were not really introduced into schools until the 18th century (1).

Proceed to Exhibit 2

STUDENT PRACTICE

2

This exhibit focuses on 19th century America. The oldest form of student practice was oral repetition. This form of memorization whether explicitly or implicitly repeated did not disappear. However, other devices for practice were developed. These devices included:

- Wax tablet and stylus
- Sand desk
- Slate
- Number board
- Abacus

(1,2)

By the last quarter of the 19th century, paper production processes and development of the lead pencil had advanced sufficiently that use of paper and pencil in schools was common (2).

Proceed to Exhibit 3

^{*}Numbers in parenthesis () refer to references which document sources of quotations and the validity of projections. A complete list of supporting documents can be found at the end of this chapter.

TEACHER
ILLUSTRATION
AND
DEMONSTRATION

3

This exhibit is focused on 19th century America.
Early in the 19th century, the blackboard was introduced. The blackboard became so popular that it was considered part of the "basic" classroom by the 1830's (2). These blackboards were not necessarily sophisticated equipment--on the contrary, the blackboard was often home-made. In the last quarter of the 19th century, teachers also used wall space for bulletin boards and pictures.

Other developments in techniques for illustration and demonstration were met with mixed reactions. Apparatus specific to various disciplines were advanced. (These included devices and objects such as maps, globes, telescopes, microscopes, and measuring instruments.) Reactions to the apparatus formed a continuum. At one extreme were those who considered the developments basic to a good education. The moderate position was that the devices tended to be too sophisticated--simpler equipment would suffice. At the other extreme were those who were vehemently opposed to the apparatus. These arguments included:

- The apparatus would replace the teacher
- Teachers did not know how to use the apparatus
- The classroom would degenerate into use of gadgetry
- The materials were too expensive (2)

The inclusion of laboratory courses in the curriculum (circa 1880) altered the objections of some people toward use of apparatus in the classroom. This alteration appeared to be related to changes in attitude regarding the place of science in the schools: it had been difficult to achieve adoption of the concept that the study of science could make important contributions to general education (2). Once this concept had been accepted, it was easier for some people to see "a proper place" for use of apparatus.

Although the pre-twentieth century developments may not have seemed sophisticated to you, they should be viewed in the context of their impact on education rather than in comparison with current society. For example, the introduction of means, in addition to the oral tradition, for recording and practicing knowledge was a major shift and has had a continuing impact on education.

Proceed to the Twentieth Century Hall

20TH CENTURY TECHNOLOGICAL APPLICATIONS

The 20th century exhibit area contains developments in audio, visual, audio-visual, and teaching machine technologies. Developments have involved both improvement of extant media and discovery of new media.

In the years following World War I, the audio-visual instruction (known at that time as visual instruction) movement emerged. This emergence can be traced by the following events from 1918-24:

- First formal credit courses in visual instruction for teachers
- First visual instruction professional organizations
- First professional visual instruction journals
- First systematic visual instruction research studies
- First administrative units of visual instruction in education (3)

This movement continued to expand--development included mergers and occasional failures--until World War II. After the war, another growth period evolved. However, around 1955, a period of transition began. There had arisen diversity in type and complexity of technological applications. The movement had also begun to investigate learning and communications theory. These factors led to uneasiness with the label "audiovisual" (3). A movement which was incorporating devices for management of instruction and was addressing learning and instructional issues could no longer adequately be categorized as "audiovisual".

During this transition period, the idea of instructional technology gained renewed popularity commercially. For example, in the mid-1960's, electronics firms merged with publishing houses. This phenomenon was labelled "marriage of hardware and software" (4). The new companies encountered hard times due to faulty assumptions about their customers and what they would buy. For example, companies planned traditional advertising campaigns for the masses. They did not realize that their campaign should be focused on individual customers. Each customer must be convinced of the "worth" of a particular product before adoption: this is true regardless of the merits of the product.

However, a beneficial by-product of the experience was introduction of the idea of validation of materials before commercial marketing (4). Although this idea had affected only a few products by the early seventies, by the end of the transition, validation was expected for most materials.

The end of this transition period was prematurely proclaimed in the sixties. This occurred when the movement tended to converge with the broader area: instructional technology. However, this transition period did not end until the emergence of the learning facilitator movement in the 1980's. This movement not only incorporated knowledge from several earlier movements, but also shifted focus from instruction to learning.

Proceed to Exhibit 4

FILM

4

The technology of film has been developing throughout most of this century. Educational film catalogues first appeared early in the 1900's. These silent films were expensive, bulky, and a fire hazard. Nonetheless, Edison predicted the obsolescence of books--he felt that instruction of the eye through the medium of the motion picture would be the answer for education (2). Yet, utilization of educational film in schools has never progressed beyond sporadic use (5). Although technological development added sound, eliminated fire hazards, and reduced bulk, objections regarding expense and conditions for use (e.g., special lighting) have remained. However, the more significant problem has been that film production is a commercial and/or artistic venture and rarely has taken theories of learning into account (2).

During World War II, training films gained favor for use in industry and the military. Educational and technical quality was not consistent (3). However, the production experience did add insight into problems in the process. For example, there was a requirement for cooperative input from educators and technicians. Another requirement was to distinguish between pictorial conceptualization and verbal tradition.

An advancement in technology occurring in the 1960's did address many of these problems. This was the use of 8mm film in brief segments (often 2-4 minutes) which were often packaged in cassettes. These films tended to be less expensive, more convenient to operate, and emphasized instruction requiring movement (5). Film in this form was utilized as part of total learning packages first in various types of learning laboratories/centers and later in multimedia systems.

Proceed to Exhibit 5

STILL

VISUALS

5

The still visual has been one of the most widely used media in U.S. education. Before the turn of the century, the magic lantern was in use in many classrooms (2). A survey conducted in 1923 found that slides were the most widely used media in schools. Others in use at that time included:

- Stereopticons
- Stereographs
- Pictures
- Photographs
- Graphic displays (3)

Developments since then have dealt primarily with advancements in the extant technology rather than in new technology. However, the overhead projector added new capabilities both in production and in delivery. The flexibility of this medium added to its popularity in the 1970's.

In the 1970's, a technology combining sound-on-slide was developed. (However, adoption of sound-on-slide in education was limited due to competition from other media.)

Historically, still visuals have had advantages over many other types of media. For example, the conflict between commercial development and

learning oriented development has been minimal. In addition, most of these technologies have not posed a major problem regarding lack of software because production does not have to be sophisticated.

Proceed to Exhibit 6

RADIO

6

Instructional radio developed in the 1920's. The largest growth occurred between 1925-35. In fact, by the late 1930's instructional radio was already in decline (3). Educational series known as schools of the air had been broadcast by commercial networks such as NBC and CBS and by educational institutions (2,3). The cause(s) of failure of educational stations has been a controversial subject. Possible causes include:

- Inadequate financing
- Competition with popular commercial offerings
- Unimaginative use of the medium
- Apathy within both radio industry and educational establishment
- Advent of stringent federal regulations
- Use of inexperienced teachers (3,5)

By the 1960's, instructional radio had been to a large extent forgotten or ignored by American educators although its use began to flourish in the developing nations of the world.

Proceed to Exhibit 7

TELEVISION

7

The technology of television has taken many forms. As the potential of the medium became apparent at the close of World War II, predictions were made that television was the panacea for educational ills and conversely that television posed a great threat to teachers. As with similar predictions for other technologies, neither of these extremist views proved to be correct (7).

Instructional applications of broadcast television began in 1948. In the 1950's, experimental series were developed by some school districts (3). However, series which explored the advantages of the medium such as "Sesame Street" and "Electric Company" (early 1970's) were in the minority.

Closed-circuit television systems appeared in the mid-1950's. These systems enabled in-house capabilities such as program production and scheduling but quality varied with experience and expertise.

The introduction of videotape enabled storage and repetitive use. It also increased the instructional potential through usage for classroom recording. Video cassettes added advantages in ease of operation and durability (5).

The technology of television more recently has been utilized in learning laboratories/centers and in multimedia systems.

Proceed to Exhibit 8

AUDIO
RECORDERS

8

In the second quarter of this century, the phonograph began to be used in schools (2). Recordings proved to be effective for certain skills for military training during World War II. These successes led to the use of recordings in language instruction after the war (3).

The advent of audio tape added flexibility to the uses of recording. For example, tape added the possibility of recording of student responses to the various listening capabilities of the medium.

Language laboratories and audiolisting centers became popular in the late 1950's. The sophistication of the instruction at this time varied greatly according to the stated purposes and other factors (6). However, typical capabilities of the units by the late 1960's included:

- Duplication
- Playback
- Listen-record
- Testing (5)

In the 1970's, the potential of compressed speech--with capability to speed up or slow down presentation--added to the instructional possibilities of recordings (8, 9, 10).

Proceed to Exhibit 9

VIDEODISC

9

In the mid-1970's, two major systems of videodisc technology appeared: one was based on an electrical pickup and the other on an optical pickup (11). The videodisc represented a mixed medium. It could be used to store:

- Pictures: black/white or color
- Pages of text
- Graphic material
- Motion-picture film: color or black/white; variable speed
- Television programming: color or black/white; variable speed
- Audio programming
- At least two channels of sound with a visual program (12)

Since recording was by frame, play back was as easy by single frame as by linear sequence of frames (13).

The widespread use of video discs in the 1980's can be attributed not only to their instructional capabilities but also cost considerations. Videodisc reproductions were competitive for as few as 10 copies (13) and became quite inexpensive for copies in large quantities (14).

Proceed to Exhibit 10

PRINTED

RECORD

10

The printed record continues to be a powerful technology. Despite predictions of obsolescence, books remain a powerful instructional technology. Yet, developments have been made in print technologies.

Microtechnology introduced microfiche and microfilm which reduce large volumes of information to small spaces; mechanical readers can then enlarge the copy to readable size (5). Readers have been developed which are compact enough to fit in a brief case (15).

The technology of photocopying has facilitated sharing of information and enabled reduction of student notetaking (5). The technology of electronic reproduction at a distance produced new instructional possibilities. One means of duplication was as part of a multimedia system (16). Another development was the electronic blackboard introduced in the mid-1970's. Transmission was via telephone hookup and could also transmit live or prerecorded voice (17).

Proceed to Exhibit 11

TEACHING

MACHINES

11

The history of teaching machines can be traced back to various starting points. For example, one could consider the concepts which Montessori included in her learning devices (circa 1907) as sufficient to label

the mechanisms as teaching machines (3).—A more strict interpretation would trace the foundation to the early work of Pressey (circa 1925). Some of Pressey's devices were developed commercially in the early 1930's and his pupil, Peterson developed the chemocard and punchboard in the same era. Nonetheless, the instructional impact of these machines was inconsequential (3,15).

Interest in teaching machines was revived by the military during World War II. After the war, further development in teaching machines for schools was conducted. Skinner and Crowder were pioneers (2,7). During this period, the machine rather than the instructional material was of primary importance. It was assumed that the significance of the technology was in the hardware (machine) rather than in the software (program) or the instructional method behind the program. Therefore, more machines than programs were developed and produced (3). This led to a state in which the number of programs was insufficient to justify purchase of the machine. Teaching machines never gained widespread use.

In the 1960's, the assumptions regarding the relationship between machine and program were questioned. This development led to a new technology, programmed instruction, which was print oriented and was based on learning theories (3). The rationale behind this technology gradually affected other technologies.

It was in this era that the National Society for Programmed Instruction (NSPI) was formed. As development proceeded and the scope of the field changed, the society changed its name to the National Society for Performance and Instruction (NSPI).

Proceed to Exhibit 12

COMPUTER

12

In the early 1960's, computer technology was introduced into education. At first, the most explored educational use of the computer was computer assisted instruction (CAI) in which the computer presented instruction directly to the student (14). Many applications involved transfer of materials from another medium rather than design and development capitalizing on potential values of the computer. This approach was neither cost effective nor conducive to selling the new technology (14).

Two CAI systems which attempted to minimize these problems were PLATO and TICCIT (TICCIT was designed primarily for use in junior colleges) (14). However, it was well into the 1980's before costs were reduced to posulated levels for these systems.

Later development explored the educational potential of computer managed instruction (CMI) (14). This form of educational computer usage did not involve direct presentation of instruction to the student but entailed management of the instruction and/or aids to individualization of instruction. The process of interaction and form of management varied. This technology (CMI) proved to be more cost effective than CAI and more amenable to adoption by teachers. For example, operating costs were lower for CMI. Teachers found applications of CMI to be less threatening than applications of CAI.

Applications of both CAI and CMI were included in the multimedia systems.

Proceed to Exhibit 13

CALCULATORS

13

An instructional application related to computer technology was that of calculators which began in the 1970's. In the span of just a few years, the cost of calculators dropped dramatically. After the price reduction, the development proceeded in two directions (18).

One branch specialized in the computational possibilities of the hand calculator. Calculators were designed with functions geared to specific fields. Educators readily accepted calculators in place of slide rules and tables. However, other computational uses have been resisted on the basis of producing mathematically incompetent and/or mentally lazy students. Even today, there is disagreement on this issue.

The second branch specialized in posing problems rather than answering them (18). The result was teaching machines and games. These calculators varied in sophistication, e.g., range selection, pacing, and programmable features (19). Utilization of these calculators was hindered by the cost of the more sophisticated models. However, home versions which included a variety of games became popular quickly.

Proceed to Exhibit 14

MULTI
MEDIA
SYSTEMS

14

The concept of multimedia systems can be traced back to the development of learning laboratories/centers and individualized instruction packages. The early systems directed learners to a variety of instructional experiences (5).

Later development entailed total systems based on a single console with multimedia capabilities. In the mid-1970's, three media were proposed as core components:

- Cable television
- Videophone
- Computer (14,20)

Advancement was hindered by the fact that the three technological applications were not compatible. Development required making decisions with potential for significant impact regarding economic or technical feasibility. Some of these decisions included choosing between:

- Ground links or communication satellite
- Copper cable or optical fiber
- Frequency or time division multiplexed distribution networks
- One-way or two-way services (20)

Educational use of the multimedia systems had not been economically feasible until the recent increase in percentage of homes with the required hardware systems.

The twentieth century developments in technological applications have been multitudinous and diverse, and the technical sophistication of these applications has varied greatly. However, few of these technological applications which you viewed were specifically designed for educational purposes.

Late in the twentieth century, educators became aware that the effectiveness of technological applications was dependent upon design. They found that it was essential for planning and execution, to be directed toward meeting specified purposes and outcomes. Gradually, educators began to differentiate between the concepts of technology as hardware and technology as design.

Your tour through the history of instructional technology exhibits has shown that few technologies have had wide spread impact on education. What causes have contributed to this? Do the emerging technologies hold greater promise for education? Can these technologies save money? These issues are discussed in the Society for Learning Facilitators Report SLFR-12. You may obtain a copy of this report when you return your playback unit.

This completes your brief tour of the history of instructional technology. At this time, you should return your varispeed recorder to the information desk in our hospitality room. We hope that you have enjoyed your tour. Thank you.

SOCIETY FOR LEARNING FACILITATORS REPORT
SLFR - 12

Throughout history, the emergence of new instructional technologies has elicited both optimistic and pessimistic reactions. Both extremes tend to see the discovery as revolutionary. However, the optimist sees a panacea for the ills of education. On the other hand, the pessimist envisions the destruction of the humanistic essence of education. In reality, despite predictions to the contrary, most technological applications have not significantly altered education.

Further investigation into the historical record indicates that similar problems affecting utilization of technology are found through the years. These problems concern feasibility in these areas:

- Availability
- Cost
- Suitability

Availability

The issue of availability can be approached on two levels. First, there is the question of technical feasibility. For example, all technological applications which the Society has displayed at the 1990 World Exposition are technically feasible. Discussion of availability on the second level is not as encouraging. These issues might include:

- Is there sufficient software or programs (5,14,21)?

Most technological applications have focused on hardware rather than on software. This focus, which has pervaded both development and diffusion of the tool, has had the tendency to affect the quantity and quality of software or programs available for the medium. This combination of circumstances has often made it difficult to justify investment in the technological application.

- Has the technology been debugged (21)?

Advocates of a product are prone to overselling: This has been true for many technological applications. It has been common to make claims regarding capabilities of a system; unfortunately, it has not been unusual for the system to fail to work as expected. These failures have appeared in varying elements. For example, the process of debugging to eliminate problems has continued long after a product is on the market.

- Is the technology reliable (21)?

Another area in which technological applications have failed to live up to their promise has been the reliability of the system. Users have often learned that they cannot depend on the performance of the hardware.

- How troublesome and costly is maintenance (21)?

A third instance of lack of credibility in the claims of technological applications has been problems in maintenance. System maintenance has tended to be both troublesome and costly.

Due to prevalence of these three types of problems--debugging, reliability, maintenance--many educators have had or have known of bad experiences with technological applications. These unpleasant episodes would affect attitudes toward future applications.

- What technical competence is required (22)?

Successful utilization of technological applications is contingent upon the technical competence of those involved. This competence may involve knowledge regarding use of the application and/or skills related to operation and programming. Traditionally, however, teachers have not been provided with training in either operation or utilization of technological applications. This lack of training has led to misuse of the application, problems in implementation, and/or hesitancy to utilize the tool.

- Has there been a systematic evaluation of the technology (21,23)?

Often, a technological application has been adopted by educators before they have had access to an appraisal of the tool. In fact, it has not been uncommon for no systematic evaluation to have been conducted. This situation has made the educators prey to the claims of advocates: claims which as shown above, have often proved to be unrealistic.

The Technology Assessment Act which was implemented in the United States in the 1970's was designed to alleviate this problem. The law required companies to have tested and recorded "favorable" results on a product before marketing. However, implementation of this act was only a partial solution because it addressed issues regarding reliability and effectiveness in operation but did not recognize issues of suitability such as those which will be discussed later.

Cost

The traditional approach to using instructional technology has been as a supplement. As such, it is somewhat understandable that even as late as the mid-1970's few studies had been conducted on the cost effectiveness of various technological applications.

As educators began to compute and compare costs between alternative strategies and technologies, they found that many factors had to be considered. Some of these were:

- How much "loose" money is available (21,24)?

Educational budgets usually involve large amounts of money. However, careful analysis will indicate that only a small percentage of this money

is actually uncommitted. It is not surprising to find that there has been substantial competition for these "loose" funds. The large capital outlay required for some technological applications has tended to place them in poor or noncompetitive positions cost-wise.

- Is more than a one-time investment involved (25)?

There is diversity across and within technological applications regarding the investment involved in procurement and implementation. The nature of the investment--one-time or recurring (e.g., two or more installments, periodic)--would affect the cost of the application and the impact of the cost on the educational system budget.

- What is the scale of operation (5,24,25)?

The scale of operation is an important factor in determining the cost of a technological application. The unit cost of an application is determined by a formula which relates fixed and recurring costs to number of students and life expectancy of hardware and software. For example, an application optimally can serve a certain number of students. Serving more students would require adding extra equipment or altering hours of access. The life expectancy of an application would range from one-time use to repeated usage over several years. In order to achieve cost effectiveness, technological applications must maximize economy in scale of operation. This is particularly true for applications involving a large initial monetary investment--unit costs can be competitive only if large numbers of students are served. Usually, this volume of students can be garnered only through extended use of an application.

- What level of quality is required (5,21,25)?

The scale of operation (time and/or numbers) often affects the level of quality which is feasible for a technological application. This assertion is based on the premise that quality is contingent upon adequate resources. (However, there is not an assumption of a one-to-one relationship between quality and cost of resources.) Adequacy of resources would involve factors such as expertise of personnel and time devoted to task. An issue which adds to the complexity of decisions is the minimum level of quality which can be tolerated and still maintain educational effectiveness.

- What is currently available (25)?

Another factor to be considered when estimating the cost of a technological application is the tools which are all ready available. However, various facts must be known before estimating the impact of in-house materials and equipment. For example, available and required per cent of the application's total capacity should be compared and discrepancies assessed. Another element is accessibility--feasibility would be differentially affected by the relative accessibility to the desired delivery site.

Suitability

The issue of suitability addresses concerns regarding how the technological application will fit into the situation. Some questions which might be raised are:

- How quickly will an application become obsolete (5)?

In calculating the life expectancy of a technological application, one factor is obsolescence. Obsolescence can pertain to hardware, software (production aspects), and content. The speed with which content becomes obsolete relates to cost factors--frequent changes in content greatly increase costs. However, the speed of obsolescence of hardware and software is important not only as a cost factor, but also as a factor in determining the suitability of a technological application. For example, discrepancies between the interval until planned up-date of content and predicted obsolescence of the hardware or software could be consequential.

- Is this product compatible with competitors' products (especially software) (5,14)?

For most technological applications, there has been strong competition between rival companies. An unfortunate by-product of this competition has been a tendency toward incompatibility between products. This situation is particularly critical concerning software because it intensifies the insufficiency of educational materials available for the application.

- Does the software make appropriate use of the medium (14,21,22,25)?

It is important that appropriate use be made of a medium. This assertion refers to two types of appropriateness. First, the application should adhere technically to the parameters of the medium. Second, the application should utilize the unique features of the medium. Too often, the application has involved transfer from another technological application without regard for the inherent differences in the tools. This trend which ignores the unique and sophisticated capabilities of applications has contributed to the practice of using technological applications as add-ons rather than as substitutes.

- Has learning theory been taken into account (5,14,21)?

For some technological applications, the impetus for development of software has been commercial and/or artistic. With this frame of reference, it is understandable that the resultant software has not incorporated techniques to maximize learning. Even in less commercially or artistically oriented applications, it has not been uncommon for the developer to ignore to some extent accepted instructional practices. These problems often have affected the suitability of the application for educational purposes.

- Is the technological application consistent with local norms (22)?

Each locale has individual norms encompassing elements such as acceptable practices and educational philosophy. To a large extent, education in

the United States has been based on local rule. Due to this, local norms are important in assessing the potential impact of a technological application because the assumptions upon which the hardware and software are based may be discrepant when compared with the norms of specific localities.

- Does the technological application handle the specific problem of interest (22)?

A variety of learning experiences are usually included in an instructional system. If the system has been well planned, each of these experiences is designed to meet a specific purpose. In a similar vein, technological applications should be selected on the basis of their ability to achieve specified purposes for management and/or delivery of instruction. In addition, the process of selecting between competing products can often be simplified if the specific problem(s) to be handled have been carefully delineated.

Emerging Technologies

Will the current emerging technologies make significant contributions to education? Or will these technologies meet the same sad fate as earlier technological applications?

The fate of the emerging technologies would appear to be dependent on how much educators and change agents have learned in these areas:

- The history of instructional technology

The historical record, as discussed above, has shown that problems and pitfalls in technological applications have not been unique but have recurred across applications. Are we doomed to a repetition of these foibles? Or can we learn from them how to plan for development and diffusion of emerging technologies?

- Problem solving and design

Technological applications have often ignored the design and problem solving elements of instructional technology. Yet, this total process can ensure that an application is geared toward educational purposes and that there are specified outcomes to achieve. Will we apply this process to the design and development of applications in the emerging technologies?

- Theories of learning

One of the pitfalls that technological applications have encountered has been ignorance of and/or failure to consider learning theory. In recent years, research on theories of learning has expanded the knowledge base considerably. Data is available on wide-ranging aspects including learning style, types of learning, and memory processes. Can we transfer this knowledge into guidelines for production and utilization of emerging technologies?

- The instructional process

Another area of information which often has been ignored is the process of instruction. Yet, research on the instructional process has provided valuable information regarding procedural and structural concerns. This knowledge holds great potential for designing technological applications which are effective for achieving specified outcomes. Will we take the time and effort to use this information?

- Theories of change and innovation

Adoption of the emerging technologies would involve change and innovation in the educational system. Theories of change and innovation and the research conducted on them have provided information on factors affecting the diffusion/adoption process. For example, it is known that increases in software production would be contingent upon provision of incentive(s) and/or removal of constraints for engaging in this activity. Will we use these theories to plan for the diffusion and adoption of the emerging technologies?

- Needs assessment

A tool which has been underutilized in the past is needs assessment. This technique can provide information about what is considered to be the essential goals and outcomes of learning and indicate priorities among them. Will we use needs assessment to avoid applying emerging technologies to achieve the wrong ends?

Each of these areas has the potential to contribute to the fate of the emerging technologies. Used wisely, they could have a positive impact on future education. Most likely, this would require a cooperative effort from all involved, e.g., educators, designers, and technicians. Are we willing to invest in such a venture?

REFERENCES

1. Suppes, P. The schools of the future: Technological possibilities. In L. Rubin (Ed.), The future of education: Perspectives on tomorrow's schooling. Boston: Allyn and Bacon, 1975.
2. Merzbach, U. C. Of levers and electrons and learning and enlightenment: Technological augmentation of cognition in the United States since 1776. Washington, D.C.: Smithsonian Institution, 1971. (ERIC Document Reproduction Service No. ED 052 617)
3. Saettler, P. A history of instructional technology. New York: McGraw-Hill, 1968.
4. Sigel, E. General learning. Saturday Review of Education, May 1973, pp. 46-47.
5. Carnegie Commission on Higher Education. The fourth revolution: Instructional technology in higher education. New York: McGraw-Hill, June 1972.
6. Sound-on-slide from 3M: A training system in a class by itself. St. Paul, Minnesota: 3M Company, 1977.
7. Atkinson, C., & Maleska, E. T. The story of education. Philadelphia: Chilton Books, 1965.
8. Rome, S., & Mallery, J. Is compressed speech a viable alternative? Technological Horizons in Education Journal, 1977, 4(4), 22-23.
9. Variable speech control: A new and vital dimension in communications. San Francisco: Variable Speech Control Co., 1977.
10. Varispeech: Speech time compressor/expander. Waltham, Massachusetts: Lexicon, Inc., 1977.
11. Wood, R. D., & Stephens, K. G. An educator's guide to videodisc technology. Phi Delta Kappan, 1977, 58(6), 466-467.
12. Magarrell, J. The imminent videodisc revolution. The Chronicle of Higher Education, April 11, 1977, pp. 4-5.
13. Winslow, K. Programmable videodiscs and videogames--What they can mean to instruction and training. Educational and Industrial Television, 1977, 9(4), 23-24; 71.
14. Brudner, H. J. The past, present and future of technology in higher education. Technological Horizons in Education, 1977, 4(3), 14-17; 22-25.
15. Periodicals on microfiche. Wooster, Ohio: Bell and Howell, 1977.

16. Monroe, E. More futures than one. Paper delivered at the Federal City College Conference, April 1974. (ERIC Document Reproduction Service No. ED 096 393)
17. Electronic blackboard. Bell System, 1977.
18. Toner, M. Calculator just a beginning. Tallahassee Democrat, March 17, 1977, 14.
19. The mathiputers. Albuquerque, New Mexico: Mathiputer Learning Systems, 1977.
20. Rensselaer Polytechnic Institute. Impact of future cable television technology: Final summary report. Troy, New York: Telecommunications Research Center, February 1976. (ERIC Document Reproduction Service No. ED 125 542)
21. Koerner, J. Educational technology: Does it have a future in the classroom? Saturday Review of Education, May 1973, pp. 43-45.
22. Mayhew, L. B. How colleges change: Approaches to academic reform. Stanford, California: ERIC Clearinghouse, July 1976.
23. Davis, R. C. Assessment in the multi-product company. Futures, 1974, 6(5), 413-419.
24. Neben, M. D. The future of educational technology. Paper presented at the New York State Educational Communications Association Annual Convention, November 1973. (ERIC Document Reproduction Service No. ED 086 246)
25. Schramm, W. Big media, little media. Beverly Hills: SAGE publications, 1977.

Chapter 6

A BRIEF HISTORY OF THE TRANSFORMATION OF BASIC EDUCATION (K-12) IN FLORIDA, 1965-1985 A SCENARIO

By

Robert G. Stakenas

Editor's Note: In this historical account, a noted "specialist" in European history turns his attention to a period of unprecedented change in public education in Florida.

PREFACE

The writing of the historical narrative contained in this chapter provides me with an opportunity to share some personal thoughts regarding my experiences as an academic historian. I must confess that for many years my colleagues and I shared a mutual disdain for much of what we knew about public education. To us, it appeared to be an important social institution but poorly run by semi-literate individuals who aspired to be recognized as "professionals." But some recent events have caused me to reexamine my assumptions about the perceived inadequacies of our public schools.

For the many years that I have labored as an academic historian pouring over primary and secondary research documents, little did I realize the intriguing drama that was being enacted in our educational system. It seemed so much more important then, to know about and really understand what was going on in Napoleon's mind at the Battle of Waterloo than to understand what was happening right outside of my office door, so to speak. It was not until I overheard my grandchildren describing their school experiences that I began to realize that something dramatic had taken place in the public schools. My grandchildren spoke of self-pacing and of learning contracts. The latter attracted my attention because my 10 year old grandson said that he was negotiating a learning contract to learn about Napoleon's influence on France--an idea that he had picked up from a casual conversation with me, his grandfather. Serious study of Napoleon in the fifth grade? In an earlier time, that was a learning task normally reserved for upper division undergraduates and graduate students. My grandson's comments whetted my curiosity and I pursued the matter further. The picture that began to emerge in my mind was that the schools had become radically changed--and I had missed the whole thing! In an age of mass media, how could I have overlooked such an important event as the transformation of our schools?

Admitting to myself that I was getting a bit tired of Napoleon after 10 these many years, I decided to investigate the events that would chronicle and explain this recent revolution in schooling. The task has been as exciting as trying to unravel a good mystery novel--and just as complicated. Perhaps I should stop before I give away the plot. Let me pause here and invite you to read what has been to me an exciting period in American education. May it serve a useful purpose for those readers who, like me, almost overlooked a series of events in our time which will have a profound influence on human progress as the 20th Century draws to a close.

RGS
Tallahassee, Florida
May 18, 1995

Part I: PRELUDE

This historical narrative begins at the close of the "golden age" in American education--the closing years of the 1960's. "Gold age" would be a more apt metaphor in that it is intended to refer to the generous levels of funding that had been enjoyed by the educational community for at least the previous twenty years. Then subtle signs began to emerge in the late 1960's that now, in retrospect, were clear indications that the "golden age" had reached its peak and was beginning to move into a slow but constant state of economic decline. The intensity of the decline, however, was not experienced until 1975 when an economic recession in the United States resulted in tax revenue shortfalls in Florida and subsequent reductions in levels of educational funding in order to balance the state budget.

Although the absolute level of educational funding remained fairly constant and even increased a little, the buying power of these appropriated dollars had been greatly eroded by inflation and price increases for the goods and services required to operate the educational system; it was as if the budget had been cut.

Economic analyses initiated by the Florida Department of Education (1),* suggested that increases in the costs of education were on a collision course with economic disaster. The state's tax structure would simply not be able to generate enough revenues to keep pace with increases in the costs required to operate the schools in their existing form. During this same period, educators were also being criticized for having allowed the schools to deteriorate in their instructional effectiveness. This harsh judgment was based on a longitudinal analysis of standardized achievement test scores which had revealed a perceptible though constant decline in achievement from 1965 to 1975 (2).

The watch word in education during this ten year period was accountability (3). The evidence seemed clear. Schools were costing more and more money to operate, yet achievement test scores were in a state of decline. Investigations, however, failed to discover any increase in malfeasance or misfeasance by school administrators or teachers. This, however, did not remove the suspicion that educators were not doing their job effectively. Something was clearly wrong. But what it was no one could say with any certainty although many offered explanatory theories and hypotheses.

The industrially-minded (4) argued that the traditional practices of education were no longer efficient enough and should be bolstered by the infusion of educational technology. We should put tools in the hands of the teachers as had been done so effectively in industry. Education must move from a labor-intensive to a capital-intensive mode of operation.

*Numbers in parenthesis () refer to references which document sources of quotations and the validity of projections. A complete list of supporting documents can be found at the end of this chapter.

The business-minded argued that our schools were top heavy with administrators; in addition, staff and facilities were poorly managed in spite of the top heaviness. After all, how could we say that resources were being used efficiently if school physical plants lay idle for three months out of each year. Improve the management and the cost picture will improve, they said (5).

More philosophically-oriented reform writers asserted that the schools were in trouble educationally; financial problems were trivial compared to the social and cultural problems facing the schools. For example, Alvin Toffler (6) claimed that the common school curriculum was anachronistic because it fell far short of being future-oriented. Individuals were therefore not being prepared to deal with the "future shock" that was descending upon them. Ivan Illich (7) took a similar position although for different reasons. Based on the premise that universal education through compulsory schooling was not possible, Illich concluded that mass education might be effective for conditioning job-holders and consumers in an industrial economy, but that in the long run mass education was insidiously destructive of fundamental human values. Illich's solution was to "deschool" society and make education more individualized and community-based. Although not as sweeping in the breadth of his analysis, Jonathan Kozol drew a conclusion parallel to that of Illich's. Kozol argues that our schools were stifling intellectual curiosity and growth of the human spirit which is so vital for the maintenance of an effectively functioning culture and society. His thesis was summed up in the title of his book, Death at an Early Age-- death here referring to the intellectual and spiritual demise of the children exposed to mass education in our schools (8).

After two legislative sessions (in 1976 and 1977) that did little to relieve the economic plight of the schools, the Governor of Florida decided to establish a "blue ribbon" panel of experts to advise him on what should be done to maintain and improve education in the face of decreasing tax revenues--in effect to achieve better schools for less money. Many educators scoffed that such a goal was absurd and was surely impossible. No one else had ever succeeded in accomplishing this in spite of similar efforts in the past.

Part II: A PERIOD OF REFLECTION AND ANALYSIS

Blue ribbon committees on the plight of education in Florida were not a new idea in Florida in 1977. During the early 1970's, the Governor had created a blue ribbon committee of citizens to look into the plight of the public schools. The stimulus for this effort seemed to emerge from the outcry for accountability, a trend that had surfaced only a few years before. This citizens' committee reaffirmed that there were problems in education but it was unable to offer any penetrating analyses of the situation or to pose any new solutions.

As the decade of the 1970's moved toward a close, the Governor felt compelled to address the issues again, only this time his blue ribbon panel would be made up of noted scholars and researchers who had

been pondering the fate and future of public education as their life's work. Based on advice from several reliable sources, the Governor selected an interdisciplinary team. It included: an educational economist, an educational researcher, an educational technologist, an organizational psychologist, an educational sociologist, a human development specialist, and an educational philosopher.

To give focus to their inquiry, the panel members identified a list of key questions. Their list included the following:

- How effective are the schools?
- What can be done to improve them?
- Why have the schools been so resistant to change and innovation?
- What can be done to reduce the costs of education without reducing its effectiveness?

After several months of preliminary analysis, the panel met with the Governor, the Commissioner of Education, and members of their respective staffs. (Inasmuch as the panel came under the jurisdiction of Florida's government in the sunshine law, we are fortunate in having access to the proceedings of this expert panel's testimony.)

As the Economist Saw It

After some brief remarks by the Governor and the Commissioner of Education, the panel members proceeded to give interpretations and to react to each other's comments. The educational economist made the initial presentation and reviewed the cost and tax revenue projections for Florida through 1985. He affirmed that the forecasts were about as precise as could be expected given the trends and present forecasting methodologies. He agreed that there would be little possibility for the educational system to expect to obtain 86% of the general revenue fund by 1985 (1). He then went on to describe an economic approach to this declining situation. His testimony follows:

An economic approach to the problem requires that production efficiency be increased. This of course assumes that the "cutput" is well defined and can be measured accurately enough to detect changes in output (i.e., achievement) brought about by changes in combinations of input (i.e., changes in resource utilization) and/or changes in technology (i.e., methods or processes). The theory is straightforward enough but there are serious implementation problems with it in education.

First of all, we don't have consensus on what the outputs of education should be. For example, should these outputs be acquisition of information primarily? Acquisition of culture? Good citizenship skills? Occupational training? Or personal

development? Even if we could get a consensus, measurement technology is not yet advanced enough to allow us to assess such outcomes with enough precision or validity to detect effects due to changes in resource mix (9).

As the Educational Researcher Saw It

Agreeing with the economist's analysis, the educational researcher went on to state that: Measures of school achievement predicted future achievement in schools but achievement in schools did not predict success in life after graduation (10). In his own words:

In our hearts we believe that education is essential to becoming a productive person. However, there is precious little scientifically obtained evidence that supports this belief. Being educated has been a social requirement for entering most professions and better paying jobs, but our present measures of educational achievement simply do not reliably predict who will be successful or unsuccessful after leaving school. Yet we go right on using these instruments year after year.

The educational philosopher responded with the remark that such facts suggested that the wrong things were being measured. He pursued the point one step further: If the wrong things were being measured, then this raised the possibility that the objectives of education were also possibly misdirected.

The educational researcher indicated that concerns about the financing of education were expressed as early as 1970 when the President appointed a Commission on School Finance. This Commission was charged with the responsibility of making recommendations to the President regarding the role of the federal government in the finance of elementary and secondary education. A research team at Rand Corporation was engaged to review educational research findings in order to identify the determinants of educational effectiveness (11). Following are some of the insights that were shared by the educational researcher.

After perhaps the most extensive review of the research literature up to that point in time (1972), our team at Rand Corporation arrived at several conclusions. The most sobering one was that research had not yet identified a variant of the existing educational system that was consistently related to students' educational outcomes. We also concluded that increasing expenditures on traditional educational practices would not likely improve educational outcomes substantially if at all. Without going into detail here, it seemed to us that there were many opportunities for significant redirections and in some cases reductions in educational expenditures without any appreciable deterioration in educational outcomes.

The Governor appeared startled by this information as one could infer from his remark: "You mean no one knows why the schools work or do not work? If we could reduce expenditures without reductions in educational outcomes, then it sounds like we've been pouring money down a rat hole for a long, long time." The educational researcher agreed in part with the Governor's conclusion and added a final note:

Our research suggests that improvement in student outcomes, cognitive and noncognitive, may require sweeping changes in the organization, structure, and conduct of educational experience (11).

As the Educational Philosopher Saw It

The educational philosopher attempted to bring the discussion back to the point that he had tried to make earlier, namely, that the goals of education had to be reexamined. In his own words:

There are at least two good reasons to reassess our goals for education. The first would be that our traditional goals may no longer be suitable for living in a rapidly changing post-industrial world. The energy crisis, over-population, and decline in natural resources are all potent forces that will bring about changes in our life styles, values, and behavior. Identifying educational goals and outcomes which will facilitate adaptation to these forces would be one good reason for reassessing educational goals. Another reason would be to determine which areas in the present curriculum are no longer relevant so that they could be eliminated thereby reducing educational costs.

So why don't we do the obvious and do such an examination? Well, I've been studying this matter for a number of years and have concluded that it goes right back to our underlying philosophy of education which is one of conservative essentialism. You see essentialists believe that they know what is "essential" in the school curriculum and therefore see no requirement to reassess the goals or content of education. The most recent manifestation of this philosophy is the "back to the basics" movement which re-emerged again around 1975 and 1976. The real significance of what I am trying to say is that as long as we resist reassessing educational goals, the only reform alternatives available to us are either to reorganize the structure of the schools or to seek additional revenues to "improve" them (12). Obviously you don't save any money by simply reorganizing or asking for more money. When I was a boy, my father taught me that the only way to save money was to stop spending it. I can say with confidence that my father's advice is still true today.

As the Educational Technologist Saw It

The educational technologist who had been observing quietly up to this point summarized the discussion. He then went on to extend the group's analysis as to why it was so difficult to reduce the costs of education under present operating conditions. One of the main reasons, he said, was that education is conceived of and implemented as a process with outcomes only vaguely implied. As a result, emphasis is placed on running the process rather than on evaluating the output of the process to decide whether or not it has been effective and efficient. Therefore, it is very difficult to determine cost effectiveness in terms which an economist would accept. Educators, then, have been accountable for process rather than for outcome. This was nowhere more evident than in accreditation standards which focused on "inputs" such as teachers' training, teachers' credentials, teacher-pupil ratios, square footage and number of books in school libraries, and all other things that had to do with resource input. Under those circumstances one could not design a cost-effective program to achieve clearly defined learning outcomes in terms of human development and other social requirements. The educational technologist then went on to say that over the years, education had not increased its productivity comparable to other economic sectors of the American society. It was not surprising that this happened because of education's emphasis on process rather than learning outcomes. In the educational technologist's own words:

When concerned educators saw the financial crunch coming, some of them tried to reason by analogy as follows. If technology can increase productivity and reduce unit costs in industry then why can't this be done in education also? One writer (4) was moved to implore the profession to "put tools in the hands of the teacher", then productivity would be increased. This was unfortunate because this argument contained two major fallacies. The first was that technology should be equated with "tools". The second was that technology as "tools" could save money.

One of the things that people in the field of educational technology have had to fight for a long time is the belief that we are out to replace human teachers with machines. This is a cultural stereotype that our culture has created because of its experience with industry where automated tools have in fact replaced many assembly line workers. The unfortunate part of my story is that people don't realize that problem solving and design processes are critical to the success of sophisticated technological applications. An engineer doesn't go out and create a new tool in a vacuum. Someone has to come to him and say, "I have this purpose or this requirement, build me a method or a means to achieve it under the following constraints." Human values, or their lack, begin to creep into the picture when design constraints are laid out. So if technological applications turn out to be dehumanizing, and many have, it's because policy makers made that decision-- it's not an inherent feature of technological applications per se.

Can technological applications reduce costs in education as we presently know it? Probably not because of education's present focus on process rather than outcome. Contrary to popular belief, there is presently little evidence that incorporating capital intensive technological applications into education, as we now know it, will reduce costs. That's not to say that educational technology as a problem solving and design process will not be able to reduce costs. We can design educative systems that are cost-effective, but things will be done a lot differently from the way we are doing them now.

I have to agree with the earlier observation that educational goals should be reassessed. It will be a difficult task, but there are ways to do it. One of the most effective ones is through a process called needs assessment (13). But to apply needs assessment methods appropriately, the schools will have to become learning outcome-oriented rather than remain process-oriented (14). Doing an appropriate needs assessment is only the first step. Most schools do not presently have the kind of planning capability that is required to design cost-effective learning outcome-oriented programs. This capability will have to be created at the local level or attempts at such reform are not likely to be effective (14).

The Commissioner of Education had been silent for a long time. But the educational technologist's comments motivated the Commissioner to break his silence with two questions: "Are you saying that educational technology offers us no help in this matter? Are we being sold a bill of goods by the manufacturers of audiovisual equipment?"

After a brief pause, the technologist replied:

No sir. What I'm saying is that inserting technological applications such as the computer or television into the schools without changing anything else is not likely to reduce costs because these applications would simply be added-on to present costs. There is ample evidence that students learn as effectively from instructional media as from traditional instruction (15). There is also ample evidence that learners can reduce the amount of time that it takes to achieve given learning tasks using individualized applications of technology. But presently there is no way to take advantage of these time savings because of compulsory attendance laws and the expectation that kids should be in school all day--the school's custodial function I believe sociologists call it. Educational technology as a design process can help us to sort out what is important from that which is unimportant. As far as instructional media go, they should be used only when it can be demonstrated that they will be the most cost-effective means for achieving required learning outcomes.

Just think, if we could figure out what to do with students after they have achieved required learning outcomes in one third less time, we would have saved more than the 20% that we are talking about saving by 1985. So if we redesign the system to be more effective and efficient, we may also have to restructure it in ways that will be socially and educationally defensible given that children will have to spend less time in school to achieve what we expect of them.

As the Organizational Psychologist Saw It

The organizational psychologist had made no contributions up to this point. But the requirements for change suggested by the educational philosopher and the educational technologist gave him an opening to enter the discussion. He agreed with the observation that education had been traditionally viewed in process terms. He then elaborated on resistance to change:

Any reforms which are defined in terms other than the instructional process will be viewed with skepticism and are likely to be rejected by teachers. From an organizational perspective, as long as educational goals and missions are defined in vague and diffuse terms, it is easier to obtain consensus on them. But this vagueness also makes it infinitely more difficult to define roles and responsibilities in ways that will enhance organizational effectiveness. The lack of adequate ways to assess the outputs of education and then relate these outputs to teacher performance makes it difficult to supervise teachers in anything but superficial terms. This also reflects itself in the reward system which tends to be based on time spent in the system (seniority) rather than on the basis of demonstrated results in terms of student learning or in terms of the level of responsibility assumed by school personnel.

Perhaps the most serious impediment to change is the fact that there are no incentives for schools to adopt cost reducing practices. This is because of present funding structures. If a school saves money, these funds will only be turned back to the central office. If money is turned back on a regular basis, then the school will be headed for a budget cut (16).

So there are lots of things working against restructuring the schools in spite of the fact that it is so badly required at this time. There are some things that people at the top, such as the Governor, the Commissioner of Education, and the legislature can do to exert pressure. But laying on a specific set of solutions is not likely to be an effective way to promote desired changes. On the other hand, without external pressure from somewhere, the schools

are not likely to change (14). There will have to be a delicate balance between applying pressure for change and being supportive of it, but not imposing the precise form which the changes must take.

Synthesis of Viewpoints

After several days of intense discussion and debate, the panel participants began to move toward a consensus. The human development specialist and the educational sociologist took an active role in adding documentation to support the thesis that the schools were not nearly as effective for promoting human development as they should be. (Inasmuch as their contributions had a great deal of influence on designing solutions to the problem, the bulk of their comments will be presented below in the section which describes the transformation process.) At the close of their deliberations, the panel of experts had agreed on the following points:

- Shifting to a learning-outcome orientation would be a fundamental requirement if educational technology were to be used effectively to reduce costs.
- The shift to a learning-outcome orientation had to be accompanied by a corresponding re-examination of educational goals to identify those learning outcomes which were absolutely essential for survival and contribution after exit from the schools.
- It would be difficult if not impossible to study (let alone optimize) the efficiency and effectiveness of schooling without the availability of useful and valid measures of learning outcomes.
- In light of the findings on class size and school achievement (17), and in light of the large portion of expenditures allocated for instructional costs (between 55% to 65%), increases in pupil/teacher ratios would be the most likely means for cost reduction.
- Reassessment of educational goals and objectives should lead to a careful prioritization of curriculum areas which could be used as a rational basis for cost reduction through elimination of low priority programs.
- The custodial function provided by the schools should be reassessed. Significant cost savings could be realized if the "baby sitting" services provided during the day by the school could be reassigned to some other sector such as parents.
- Optimizing use of school resources would require reducing fixed costs to a minimum while trying to shift costs to accommodate to fluctuations in student enrollments to variable cost mechanisms.

Part III: THE TRANSFORMATION BEGINS

Needs Assessment as the Starting Place

The meeting of the Governor's blue ribbon panel had set the stage for what was to become one of the most remarkable periods of change in the history of education. The panel had made a convincing case that the starting place was to shift the schools to a learning outcome orientation. This was to be accomplished at the same time that each school district began to reassess its goals by means of an "alpha" needs assessment. The concept of needs assessment was not new in education although the concept of an alpha type, externally-based needs assessment was.

During the late 1960's and early 1970's, the concept of need had been defined as a discrepancy between the present state of affairs and the desired state of affairs. Because of the process-oriented nature of education, needs assessments tended to focus on process gaps. An alpha needs assessment, on the other hand, was intended to address learner outcome gaps rather than discrepancies in process. The three basic requirements for an alpha needs assessment included (13):

- That needs be defined in terms of gaps in learner performance (i.e., be learning outcome-oriented);
- That all educational partners participate in identification and prioritization of needs (partners referring to students, implementers, and parents and community members);
- That the relevance or usefulness of learning outcomes be judged against an external referent (i.e., those skills, knowledges and attitudes required to survive and contribute to society after exit from the schools).

Carrying out such an undertaking on a state-wide basis presented a supreme challenge. First of all, the DOE had to assemble a team that could provide technical assistance to any school district that required it. University faculty assigned to Teacher Education Centers were also retrained to provide technical assistance to school systems in their respective service areas. Absence of school system capabilities presented the greatest problem; they lacked sufficient personnel with the required technical competence to perform effective needs assessment and planning. The Governor had been forewarned of this possibility and took the leadership to convince the legislature to provide one-time-only incentive funds to create needs assessment and planning units within each of the 67 Florida school districts. This required an expenditure of \$13.4 million dollars (or less than 1% of the education budget in 1976) each year over a three year period. The school districts themselves were expected to pick up all costs for planning units by the beginning of the fourth year. Failure to begin on time resulted in losing an amount of funding proportional to the length of time the needs assessment process was delayed beyond the required start-up date.

The concept of home rule was retained to allow each district to identify survival needs relevant to its locale or region. The learner outcome gaps identified varied from district to district. In some areas, severe deficits in reading and computation were identified. In still other districts, poor citizenship as manifested in vandalism and disruptive school behavior was identified as a serious performance gap. Still other districts felt that their students were too dependent on adults for guidance in learning and that the students did not show enough interest in doing well in school. Some districts identified outcome gaps in the value and character areas that included taking responsibility for one's behavior, dependability, and a positive attitude toward finding and holding a job. Another commonly identified gap dealt with career planning skills when it was found that learners had been choosing training for occupations for which there were no jobs or for which they were not suited, thus ending up unemployed.

Once the learner outcome gaps were identified within a community, the next step was to prioritize them by estimating the "cost" of removing each performance gap with the "cost" of ignoring it (13). In some cases the costs were actual dollar figures, in other cases the costs were estimated in terms of social and psychological factors such as disruption of community life, etc. Once the needs were prioritized and costed out, the community was then invited to set a budget level for those program components which it desired to see implemented. This was consistent with the local control philosophy that had been adopted in Florida several years earlier. The involvement of the community in goal setting and budget preparation was very time consuming but it had many salutary effects. Interested taxpayers began to understand what they wanted to have accomplished by their schools and at what cost. By having an opportunity to examine the structure of school budgets, community leaders were able to convince themselves as to whether or not school management was being done rationally and efficiently. Gradually, initially defensive postures began to fade into ones of increased confidence and commitment to work things out.

Enter Problem Solving

The next major task was to redesign the curriculum and to identify the most effective methods and means to remove learner outcome gaps that had been identified by the needs assessment procedures. The design and planning was facilitated by following an extremely simple but effective problem solving model that was linked with the needs assessment that had already been done. In its simplest form the problem solving model contains six steps (13). The model is shown in schematic form in Figure 1.

The first step (1.0) was to define the problem in terms of documented needs. This had been done in the externally-referenced needs assessment with need being strictly defined in terms of gaps in learner performance.

The next step (2.0) was to determine solution requirements and to identify solution strategies. This set of activities was a joint

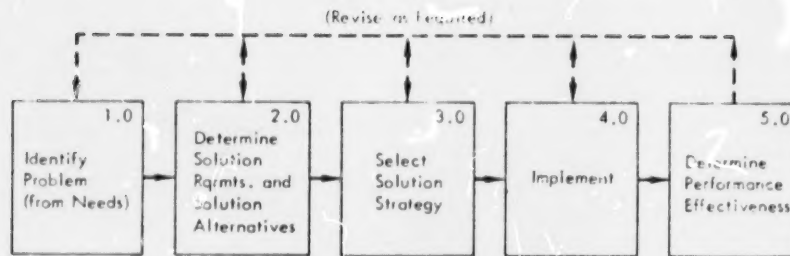


Figure 1. A general problem solving process. Five of the six steps are identified and numbered; the sixth (re-
 vise as required) is indicated by the broken lines. Re-
 vision may take place at any step. Based on Kaufman (13).

effort involving locally-based curriculum development teams that were being assisted by local planning units that had just been established. It was not unusual for these planning and design groups to invite experts from related disciplines to assist in conceptualizing local problems and in determining solution strategies. For example, one community retained the services of a human development specialist and an educational sociologist. Following is an example of the kind of testimony given to the planning and design teams in the school districts. The human development specialist offered this analysis:

Researchers such as Bronfenbrenner (18) state that changes in cultural patterns regarding work and child care are having a negative impact on the development of children. As a result of coming home to houses that are "empty", we have been seeing the evolution of destructive peer-group cultures even among affluent, middle class communities. We are also seeing more and more age-related segregation that is harmful to human development. We are seeing children being segregated from each other and from adults by the organization of our schools. All of these are having a negative impact on the disintegration of the family. Children are unlikely to get a good start in life unless they come from a stable and caring home environment which gives them the initial support required to go out into and survive in the external world. But support should not end there. All human beings, regardless of age, require support in order to be adjusted and productive in their lives.

We are much indebted to the research and theory developed by Bronfenbrenner to understand what is going on to promote the disintegration of social relationships in our culture. For example, he believes that the two most powerful settings that affect the family are the world of work and the world of the neighborhood. We must find ways of scheduling work that is not so disruptive of family life. As you all know, the schools have been assigned a custodial function in order to keep young people off the streets or out of the job market. If schools are to perform this function, they have to do more than "develop the mind." With more and more families having two wage earners, the school is increasingly looked upon to provide "baby sitting." Assuming that teaching children "useful" knowledge will promote positive development is to miss the whole point. Teachers and other students must become an alternate support system and provide the caring that families normally provide. Presently this is not being done as evidenced by the aimless destruction we see in our schools (18).

Part of the problem lies in the competition and individuality that is so highly valued by our culture. It's difficult to build the support and caring that is essential for human development if adults are in constant competition with each other and the children likewise. We ought to replace our present emphasis on individual achievement and competitiveness between "players" with an emphasis on competition against standards of excellence. If the goal is to achieve or exceed a standard of excellence, then individuals can work together cooperatively toward that goal. In this way, almost everyone has a chance to be a winner. Win-lose competition to which we have become accustomed takes an extremely heavy psychological toll on those who cannot compete effectively. They suffer from apathy and indifference. This results in a waste of human potential in the long run (18).

These comments created a stir among members of the curriculum design team. On the one hand, the human development specialist challenged the value of competition which was seen in highly positive terms by many. On the other hand, she did have a good point about the disintegration of family life. And after all, some observed, the consultant was not completely removing the element of competition, she was simply redirecting it from competition among peers to competition against standards of excellence.

The next consultant was an educational sociologist who re-emphasized some of the points that had been made earlier. He acknowledged that he was very pleased to learn of their concerns about the lack of students' interest in schooling. He attempted to explain reasons why he believed this would be true. In his own words:

James Coleman, the noted sociologist, and others believe that one of the basic characteristics of schools nearly everywhere is that the student role is essentially passive. But passivity seems to take on new qualities when it is shared among a very large number of young people, prolonged over many years, and involved in relations with specialized teachers who know little about the students as individuals. The deepening passivity promotes counterforces: a seeking by the young for autonomy and activity in a world of their own--the youth culture--and a highly resentful reaction to what they are asked to do as students. We have to find better ways to help them psychologically "own" what happens to them in schools. They can't be preached at and directed every minute of the day (19).

Coleman also says that young persons require both activity directed toward self-development and practical activity directed toward the outside on which others depend. Neglect of the first results in an unskilled adult, impotent to deal with a complex world. Neglect of the second leads to frustration of the idealistic, creative, and constructive impulses of youth (19).

In a report dealing with youth in transition, Coleman and a panel of experts express concern about the divorce of work and education. They (19) stated that an answer to this dissociation has been to diversify the school so that it comes to incorporate "real life" situations. While this approach is not without merit, it has its drawbacks. First, it places an enormous administrative burden on the schools, which find themselves besieged by demands to incorporate the latest trends into the curriculum. No matter how earnest the efforts are to recreate the world in the school, the school is not the discipline of the world and is not perceived by students as "real" (19). After examining both sides, I feel that the benefits of incorporating noncognitive activities into schools are far fewer than those from organizing them outside of schools. The principle benefit of the former path seems to be organization "neatness" and insurance that all youth will be "covered" by such activity. But the costs are the distortion of such activity to fit the organizational characteristics of the school, a distortion that strikes at the very heart of the activity (19).

Testimony by the consultants had provided additional documentation to verify the problem. The solution requirements which evolved out of the needs assessment and information provided by the consultants could be summarized as follows. If what the experts were saying was true, then learning outcomes promoted by the school should be more closely linked with external demands placed on students when they would attempt to survive and contribute outside of school. In addition, it would be necessary to recreate a sense of community among children, youth, and adults as well as a true sense of family among parents and their children--a difficult task considering the incidence of broken homes and

families with two fulltime wage earners. This would require breaking down the segregation that had been created by age-graded forms of school organization and segregation between adults and youth which permitted the emergence of deviant cultures among a community's youth. In addition, it would be necessary to shift the role of learners from one of dependence on teachers to one of independence and self-direction for learning. Win-lose competition in academic areas (e.g., grading on the curve) would have to be replaced by cooperative approaches that would reward everyone who was able to demonstrate mastery of established standards of excellence. Underlying all of these actions would be a requirement to instill norms and values supportive of taking responsibility for oneself and for one's community.

Components of Design

The local curriculum design teams then went to work. They were assisted by educational technologists and planners that had been hired to create the local planning capability described earlier. Technical assistance was also provided by consultants from the DOE and by university faculty assigned to Teacher Education Centers.

Now that solution requirements had been identified, the next step was to spell out solution alternatives and then evaluate each alternative in terms of projected effectiveness, feasibility, and potential for cost reduction. The results of this stage of the planning are summarized in Table 1 (see next page).

After a careful assessment of each alternative, the planning and curriculum design team selected the following solutions (step 3.0 of the problem solving model):

- Individualized learning contracts to increase interest in learning and to develop self-directed learning skills
- Mastery learning and testing strategies to increase motivation by allowing students to compete against standards of excellence with many trials being allowed in order to achieve mastery ultimately
- Group-based learning contracts to develop group membership and problem solving skills
- Cooperative work/study programs to articulate schooling with the world of work outside of the educational process
- Supervised volunteer activities outside of school to nurture interest and develop skills to improve human and community welfare
- Student/parent problem solving groups to bring families closer together and equip them with skills to become more effective in promoting the development of children

TABLE 1

ANALYSIS OF LEARNER OUTCOME GAPS, SOLUTION REQUIREMENTS, AND SOLUTION ALTERNATIVES

Learner Outcome Gaps	Solution Requirements	Solution Alternatives
Students lack interest in attending school and in learning	Develop methods and means to increase interest in school as measured by a reduction of 20% in tardiness and 33% fewer dropouts	Assign learning projects based on individual student interests and capabilities via individualized learning contracts; other means
Students are dependent on teachers for instruction and learning	Reduce learner dependence as measured by a 25% increase in the quantity and quality of self-directed learning contracts	Assign individualized, self-directed learning contracts; use mastery learning strategies
Observed levels of vandalism, student alienation, use of drugs, and other deviant behavior are high	Integrate youth back into mainstream of community norms as measured by a 20% decrease in vandalism, drug abuse, and other acts of deviant behavior	Create supervised volunteer activities outside of schools in support of human and community welfare Assign value clarification exercises Start parenting education for families Hold student/parent problem solving groups
Students read below parental and employer standards	Increase reading comprehension as measured by a 30% increase in Nelson-Denny Reading Test scores	Adopt materials geared to learner's culture, interests, and ability Assign teaching reading to all teachers Use mastery learning strategies Develop parents' reading-tutor skills
Students solve math and social problems below parental and employer standards	Improve problem solving skills as measured by a 25% increase in NAEP mathematics and NAEP social problems subtest scores	Assign self-directed and group-based learning contracts Assign group problem solving exercises Use mastery learning strategies

- Specialized high schools (e.g., in arts and humanities, and vocational and technical education) to create a community of learners and teachers intensely interested in the same areas and to allow students more options than simply those provided in the school in their particular neighborhood (19).

How these solution alternatives were translated into an implementation plan (step 4.0) is described below.

Early Years Critical for School Success

The importance of early learning had been established by a number of theorists and researchers (20). In addition, there was evidence that children demonstrate greatest gains in reading, language, and arithmetic achievement in the earlier grades with the second grade being a peak period of development in these skills (21). In addition, research on class size suggested that school achievement was correlated with class size at the early elementary years but not at any other grade levels thereafter (17) with smaller classes being associated with higher achievement. It was clear, then, that kindergarten should not be eliminated from schools as some had suggested. It was also clear that these were extremely important formative years so that every effort should be made to assist each learner to acquire a good foundation in basic and learn-how-to-learn skills during these early years. It was decided to attempt to keep class sizes small or no greater than 25:1 for kindergarten through the second grade. This offered no cost reduction potential but was justified on the grounds of helping each learner to obtain the best possible start at developing basic skills. On the other hand, pupil/teacher ratios would have to be dramatically increased during all subsequent grades in order to achieve the 20% cost reduction goal that had been mandated by the state legislature.

Self-Management and Study Skills as Explicit Curriculum Goals

In addition to written and spoken communication skills and arithmetic skills, self-management and study skills were added to the curriculum. This was deemed necessary in order for students to be ready to be successful in the individualized self-paced learning systems that were emphasized throughout the remainder of their school experience. In addition to facilitating learner achievement, self-paced learning systems permitted more intensive use of personnel and physical facilities. One of the interesting new problems that had to be dealt with was what to do with learners who were achieving learning objectives ahead of schedule. Where ever possible, accelerated students were permitted to go on and study individualized learning materials at the next "grade level" while still being permitted to stay with his or her "homeroom group" for social reasons. This was accomplished through the use of learning resource centers that contained learning materials over a wide range of grade levels.

Maintaining Student Interest in Learning

When students became mature enough to handle them, they were encouraged to engage in designing learning contracts (22) to satisfy personal learning objectives while also demonstrating that they had achieved reading and writing skills, skills in information retrieval, and in problem solving. Thus the learning contracts permitted flexibility without requiring a heavy investment in prepackaged curriculum materials (other than an adequate reference library) while at the same time helping students to develop skills that would facilitate life long learning. The effect of the learning contracts was to reduce discipline problems that previously arose among bright and disinterested students who either had already mastered the curriculum goals for their grade or had perceived these goals as boring or irrelevant. Thus the learning contracts promoted acquisition of information by each individual learner while also helping him or her to develop problem solving, self-management, and communication skills. The practice of learning contracts was introduced gradually to rapidly progressing students in the 4th and 5th grades. Assignment of individualized learning contracts continued all the way to graduation from high school.

Once students had demonstrated that they could set learning objectives for themselves and pursue them successfully, they were then required to complete a minimum of two group-based learning contracts each year. The rationale for group-based learning contracts was that children should possess interpersonal, communication, and problem solving skills to be effective adults. Thus, in addition to being evaluated on the content, members of a group would also be evaluated in terms of their leadership skills and contributions, their cooperation, and their willingness to accept responsibility.

The school day still emphasized many group activities although these were usually media events, such as films, supervised by para-professionals with skills in group discussion techniques. This strategy thus relieved certified teaching personnel from providing the custodial function while freeing them to work with individual students who were either having learning difficulties or seeking assistance with a learning contract.

Use of Technological Applications

After analyzing the costs involved in adopting "big media" applications such as instructional television and computer networks, most school systems chose to use intermediate level applications and the "little media". Intermediate level applications included videotape recorders and microcomputers. "Little Media" included film strip projectors, audio cassette tape recorders, programmed instruction, etc. Videotape recorders and microcomputers were selected because they could be moved from classroom to classroom or used in the individualized learning resource centers. Portable equipment was chosen because it was found that videotaped materials and drill and practice exercises on microcomputers were most effective for assisting students to acquire learning objectives at the basic skill levels. But once these levels

had been attained, the hardware would sit idle. Therefore, one item could serve more than one group of learners by permitting it to be used on a rotating basis.

Program Reduction as a Cost Reduction Strategy

Many of the school offerings that had become common place during the 1960's, such as general music and foreign language study, were no longer supported by taxpayers and were therefore dropped as general requirements. This did not preclude the study of these subjects by students who were highly interested and who possessed adequate self-paced learning skills. Individualized materials for subject areas that had been dropped from the curriculum were available in learning resource centers if students wanted to study them. However, providing these materials could be done at a fraction of the cost that had been required to staff such a program for all children on a day to day basis by a live teacher--as had been the common practice in the 1950's and 1960's.

To reduce costs, one innovative school district chose to do away with its program of organized team sports in favor of a program of physical fitness and leisure studies. Existing facilities were still used for team sports but this was all done after school on the basis of intramural teams coached by interested parents and retirees who had a continuing interest in sports and in the development of young people. The school physical education program emphasized ways to maintain physical fitness and introduced students to life time sports (e.g., golf, tennis, volley ball), leisure pursuits such as folk dancing, and other ways to use one's leisure time. The focus of the physical education program was on participation rather than on competition in which only a few could benefit from participation while the rest were relegated to spectator status.

Integration of Individualization and Social Development

At first many parents feared that individualized self-paced learning would remove opportunities for social development. However, once social development was identified as a desired area of learning by the needs assessment, instructional designers and teachers went to work to create social learning experiences that were carefully integrated into almost all individualized learning sequences. When this was not feasible, specific group-based learning experiences were designed in areas such as values clarification, group problem solving, and human relations skills laboratory. In individualized courses, students could choose to do group learning contracts if partners with similar interests could be found. At other times, small group learning activities were designed into learning sequences. For example, certain modules would require a learner to find someone else who was working on the same module so that they could interact and produce a joint product. These were used to facilitate development of appreciation and development of group problem solving and group discussion skills in addition to acquisition of subject matter information contained in the module. Once teachers and designers recognized the amount of flexibility which could be provided

by self-paced learning and the ease with which different kinds of learning outcomes could be integrated into learner-oriented materials, they began to see other ways to reduce the number of curricular offerings without being afraid of sacrificing the quality of learning outcomes. Facilitation of writing skill development, for example, was done by almost every teacher inasmuch as basic information was being presented by print or other instructional media thus allowing the teacher to focus on monitoring and guiding student educational development. In addition, individualized and small group learning contracts provided the flexibility and variety required to maintain high interest for both students and teachers.

The Cost Reduction Strategy

The legislature had mandated a cost reduction goal of 20% for all school districts by 1985. After considering various alternatives, it became clear that the cost category with greatest cost reduction potential was instructional costs. It comprised 58.2% of total expenditures. The next largest area was capital outlay at 12.1%. All other expenditure categories varied from 2.5% to 8.8%--unlikely candidates for major cost reduction although no savings however small should be overlooked.

Another important piece of data was the fact that approximately 6000 teachers left the profession in Florida annually either to retire or for other reasons. This amount of teacher turnover raised some interesting possibilities. Which positions could go unfilled in order to reduce costs? The "frill" subjects such as music and foreign language study were among the first to go. But this did not generate a large enough saving. Increasing pupil teacher ratios appeared to be one of the more powerful techniques inasmuch as previous research had shown that class size did not appear to be related to achievement except during the early elementary school years. Another possibility was to eliminate either a beginning or an ending grade. Inasmuch as the importance of early learning during the early years had been established by previous research, it was decided to retain kindergarten classes and to make every effort to extend developmental experiences to the pre-school years if at all possible.

After careful consideration, it was decided to eliminate the 12th grade from the school curriculum. This permitted a savings of 2.7% and appeared to create the least number of educational and/or training problems. However, it did raise the issue of what to do with youth 17 and 18 years of age given the general unavailability of employment opportunities at those age levels. The principal means for cost reduction was to double pupil/teacher ratios for grades 3-11 which achieved a cost reduction of approximately 15.6% (1).

Social and Economic Costs of Eliminating the 12th Grade

As Coleman and his associates (19) had pointed out, the comprehensive high school as advocated by Conant in the 1950's had outlived its usefulness. First of all, it required bringing together a large

mass of students in order to justify offering a "comprehensive" curriculum. Large size increased the possibility of social problems brought on by increases in school population density and the behavioral management problems it engendered. A "comprehensive" curriculum was not particularly cost effective either. Many subject areas were under subscribed by students. Although small classes were favored by students and teachers alike, they increased operating costs immensely. According to Coleman, it would be far better to create specialty high schools that were relatively small and that would attract both students and teachers because of a special emphasis such as the performing arts, technical studies, etc. Thus segregation between teachers and students brought on by specialization would be broken down by intense mutual interest. Specialty high schools would also reduce the de facto segregation which often occurred by requiring students to attend the high school in their part of the school district. The specialty high schools, on the other hand, would be open to any student, regardless of residential location, so long as he or she met entrance requirements.

But what was to be done with students who would now be leaving high school a year early? For several decades, the schools had been assigned the function of keeping youth out of the job market for one or more years. Eliminating the 12th grade would serve to exacerbate the situation unless something could be done.

The students welcomed being able to graduate from high school a year early if they could pass the minimum competency tests required for graduation. Students who were not yet prepared to be accepted into a college or university continued their preparation by attending a local community college until they were able to meet entrance requirements or pass required entrance tests. The more serious problem was what to do with the 17 and 18 year olds who wanted to find a job but could not. Many of them could go on for vocational training either in a community college or in one of the numerous vocational-technical education centers that had been established in Florida between 1975 and 1980. In addition, volunteer programs were developed in communities to provide opportunities for unemployed youth to make valued contributions through tutoring in the schools, working in cooperative education "job" placements in a business, in an industry, or in a social service agency. The goal was to attract and permit every young person who did not have a clearly defined educational or vocational goal to be engaged in some type of socially valued and personally satisfying activity. Research had shown that this type of involvement had begun to reduce juvenile delinquency, drug abuse, and teenage pregnancies.

There were social and economic "costs" to be reckoned with. For example, the volunteer and cooperative education programs were not always viewed in positive terms by employees and union members. They were afraid that the number of jobs available in participating businesses and social service agencies would be reduced because of the "free labor" being provided by youth. Some argued that we were reverting back to the exploitation of child labor that had been prevalent in the 19th century during the industrial revolution. Monitoring procedures had to be introduced to ensure that employers did not use volunteers to replace job holders.

In the 1970's, Coleman and others (19) had advocated experimentation with a variety of techniques to permit youth to gain experience in the world of work without penalizing employers for the low production efficiency of young trainees. Some of the innovative suggestions included instituting a dual minimum wage. Someone learning skills to enter a trade would be paid at a lower rate than he would receive once his training would be completed. Vouchers to allow youth to seek out and pay for occupational training was another suggested alternative. Another was to pay subsidies to employers for providing training. The problem with each of these plans was how to fund them. In the past the schools were supposed to keep youth off the streets. When the 12th grade was eliminated to reduce costs of schooling, educators were saying that someone else had to assume responsibility (and the "tab") for keeping youth occupied in productive ways. Society would have to pay one way or another--now for schooling or later in the form of rehabilitation costs, maintenance of prisons, social welfare payments, etc. Elimination of the 12th grade made these costs much more visible to the tax-paying public. In any case, it boiled down to the question: When do you want to pay for it: Now or later?

State-Wide Assessment: An Attempt at Quality Control

State-wide assessment had come into being during the late 1970's. At the outset, it was believed that the state-wide assessment program would be an effective evaluation tool. It was discovered, however, that the testing instruments often did not measure learning outcomes that had been deemed highly important by local needs assessment procedures. When competencies were assessed, there were often only three or four items for an area thus raising questions about the reliability of skill sampling in that area. In addition, the state-wide assessment instruments attempted to measure a wide variety of outcomes using machine scorable answer sheets in order to reduce costs and to make the entire procedure more efficient. As a result, many important student outcomes which required students to demonstrate writing or analytical skills were not adequately measured.

Another problem that emerged had to do with setting of minimum competency standards. Should they be the same for all school districts or subject to local control? Preliminary cost estimates as to how much it would cost to provide remedial instruction to bring all school districts up to "standard" turned out to be prohibitive. It seemed to make better sense to allow local communities to set minimum levels and be permitted to find other ways to assess curriculum goals which were identified as being important.

Although machine scored tests had been the choice because of cost factors, it was now time to search for other alternatives. Useful prototypes were found in materials and procedures that had been developed by the National Assessment of Educational Progress (NAEP). The NAEP project had been an early entry into the field and had also become dissatisfied with machine scored tests for assessing all types of learning outcomes. As a result, they began to experiment with ways to assess

and evaluate free responses created by students. The solution was to prepare criteria and training manuals so that volunteers from a local community could be trained to serve as reliable scorers. Student products would be scored "blind", that is, all personal identification and school identification were removed to reduce the possibility of positive or negative rater bias. Using locally-trained paper graders helped the local volunteers to learn first hand how well students in their schools were learning. In this way many citizens had an opportunity to observe the impact of the school directly on students' ability to perform required tasks.

Now that useful measures of school achievement--output if you will --had been developed, this set the stage for controlled experimentation with different resource allocation patterns within school programs. For example, pupil-teacher ratios were allowed to increase as high as 60 students to one professionally licensed teacher with pupil management support from paraprofessionals and teacher aides. Managing this large a "home room" class required support from information storage and retrieval devices such as minicomputers. These were required to monitor student progress and prescribe learning activities for students in individualized self-paced learning systems.

It did not take school districts very long to realize that the sophisticated planning capabilities which had been created could not be used effectively unless these planning units received feedback on the effectiveness of the solutions that were being implemented to remove learner outcome gaps. Therefore, each district had to assemble program evaluation units whose purpose was to evaluate (step 5.0 of the problem solving model) the impact of the new curriculum and the instructional means that had been selected to implement it. The capitalization for this evaluation function was achieved by not filling positions vacated by retiring teachers and then using these funds to create local evaluation teams that worked closely with the needs assessment and planning units.

Retraining of Teachers to Operate Individualized Learning Systems

The transformation of the schools could not have been accomplished without effective retraining of existing teaching personnel. The vast majority had been trained to "teach" rather than manage student learning. However, the individualized learning systems required major changes in roles and learning management competencies. Fortunately, the mechanism to achieve this massive retraining had been established by the Omnibus Education Act of 1973.

The Omnibus Education Act had created a system of Teacher Education Centers which were a means to coordinate efforts of university faculty and the local schools. In many cases, the local schools were able to identify inservice training requirements before university faculty had acquired the skills to provide the appropriate inservice training. Once it became clear to university faculty that their survival depended on effectively meeting needs out in the school based sites, they quickly upgraded their knowledge and skills in order to capture their "share"

of the TEC funds allocated to their university. Nonresponse, or a poorly valued response led to solicitation of services from other agencies in Florida thus threatening the economic survival of the university faculty whose services were not in demand. Creating a market situation regarding inservice training helped to facilitate the upgrading of skills of both university faculty and teachers in local districts.

Part IV: AFTERMATH

The schools of Florida looked very different as they moved into 1985. Many traditional subject matter areas in the curriculum had been replaced by skills, knowledges and attitudes required for survival in a post-industrial age. The K-12 system had been truncated into a K-11 system with no apparent negative effects in terms of student achievement. Teachers stopped teaching and more learners began learning! This was brought about by including explicit curriculum goals to increase student interest and motivation through individualized learning systems and self-directed learning contracts. By adopting a learning outcome orientation, teachers were now saying that they were willing to be held accountable for learner outcomes whereas before they felt threatened to be held accountable for anything but implementing the teaching process.

Most of the school districts achieved a successful transformation by 1985. The ones that were able to do so exhibited some common attributes. These attributes included:

- A commitment to identify real causes of problems
- A willingness to involve all educational partners in the change process
- An ability to cooperate in selecting and working toward commonly accepted goals
- A willingness to change and break with past traditions

A small number of school districts failed in their quest to change. Some went bankrupt; others had to operate their schools on a drastically shortened school year. A few found it unfeasible to contemplate operating up-to-date programs. Instead, they sought assistance from the legislature to give parents vouchers that would enable them to send their children to schools of their choice in adjacent school districts. Funding for the vouchers was derived from local and state taxes that would have normally been used to fund the local school program which now could no longer operate effectively on that level of funding. The freedom of choice provided by the voucher system in these districts has had a salutary effect in that vendor schools (i.e., schools most likely to be the recipients of students bearing vouchers) attempted to attract and hold these students by increasing the attractiveness and effectiveness of their school programs.

The schools in Florida appear to be ready for entry into the 21st Century. It is uncertain when the next major transformation will be required. When it is, future educators will do well to review the achievement that occurred in Florida education between 1965 and 1985. This is one lesson of history that would be worth repeating--when the time comes.

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REFERENCES

1. Florida Department of Education. Analysis of projected enrollments, expenditures, and revenues for public education in Florida 1974-75 through 1985-86. Author, July 1976.
2. Ebel, R. L. Declining scores: A conservative explanation. Phi Delta Kappan, 1976, 58 (4), 306-310.
3. Lessinger, L.M., Parnell, D., & Kaufman, R.A. Accountability: Policies and procedures (4 vols.). New London, Conn.: Croft Educational Services, 1971.
4. Abert, J. G. Wanted: Experiments in reducing the cost of education. Phi Delta Kappan, 1974, 55 (7), 444-445.
5. Callahan, R. E. Education and cult of efficiency. Chicago: University of Chicago Press, 1962.
6. Toffler, Alvin. Future shock. New York: Random House, 1970.
7. Illich, Ivan. Deschooling society. New York: Harper and Row, 1971.
Illich, Ivan. The alternative to schooling. Saturday Review, June 19, 1971, pp. 44-48; 59-60.
8. Kozol, Jonathan. Death at an early age. Boston: Houghton Mifflin, 1967.
9. Wallhaus, R. A. The many dimensions of productivity. In R. A. Wallhaus (ed.), Measuring and increasing academic productivity: New directions for institutional research (No. 8). San Francisco: Jossey-Bass, Inc., 1975, 1-16.
Hanushak, E. Learning by observing the performance of schools. In R. A. Wallhaus (Ed.), Measuring and increasing academic productivity: New directions for institutional research (No. 8). San Francisco: Jossey-Bass, Inc., 1975, 17-38.

10. McClelland, D. C. Testing for competence rather than for "intelligence". American Psychologist, 1973, 28 (1), 1-14.

Hoyt, D. P. The relationship between college grades and adult achievement: A review of the literature. ACT Research Reports, September, 1965, No. 7.
11. Averch, H. A., Carroll, S. J., Donaldson, T. S., Kielsing, H. J., & Pincus, J. How effective is schooling? A critical review and synthesis of research findings. Santa Monica, Calif: Rand Corporation, March 1972.
12. Wingo, G. M. The educational scene today. Innovator, Ann Arbor: University of Michigan School of Education, 6 (11), 1975, 1;3.
13. Kaufman, R. A. Educational system planning. Englewood Cliffs: Prentice-Hall, 1972.
14. Temkin, S., McCann, R., & Connolly, J. An assessment of the prospects for widespread school improvement. Educational Technology, 1977, 7 (1), 7-12.
15. Stakenas, R. G. & Kaufman, R. A. Costs and effectiveness of technological applications in education: A literature review. Tallahassee: Florida Department of Education, January 1977. (STAR Project No. 76-2061)
16. Pincus, J. Incentives for innovation in public schools. Review of Educational Research, 1974, 44 (1), 113-144.
17. Jamison, D., Suppes, P., & Wells, S. Alternative instructional media. Review of Educational Research, 1974, 44 (1), 1-67.
18. Byrne, S. Nobody home: The erosion of the American family. Psychology Today, May 1977, pp. 41-47.
19. Coleman, J. S. (Chairman). Youth: Transition to adulthood-- Report of the panel on Youth of the President's Science Advisory Committee. Chicago: University of Chicago Press, 1974.
20. Bloom, B. A. Stability and change in human characteristics. New York: John Wiley, 1964.

Hunt, J. McV. Intelligence and experience. New York: Ronald Press, 1961.
21. Stier, S. Report on education innovation: New not necessarily better. APA Monitor, March 1977, pp. 20;27.
22. Knowles, M. Self-directed learning. New York: Association Press, 1975.

Chapter 7

IMPROVING THE K-12 EDUCATION PROGRAM IN FLORIDA:

SOME QUESTIONS WHICH MUST BE ASKED

by

Pamela Eaddy

Introduction

The preceding scenarios have allowed you to explore several possible futures for Florida education in the year 1985. As a point of departure, each has provided substantial documentation of the climate of depression, both psychological and economic, which characterizes the educational system in 1977. We have seen that the financial prospects are dim. A projection of current trends suggests an educational system requiring up to 86% of the total state revenue fund by 1985 if no new sources of revenue are identified and tapped. We have read of the dissatisfaction of parents, administrators, taxpayers, and legislators with the quality of schooling being provided. Finally, we have been reminded that schools cannot be isolated from the communities in which they exist. The world is very different from what it once was--and changing by an order of magnitude to which we are not accustomed.

Three of the scenarios offer some exciting options, possibilities of more economic, effective, humane, and valid education than schooling as we know it in Florida today. A fourth scenario paints the frightening picture of economic chaos, policemen in the halls, vandalism, massive teacher lay-offs, and negligence suits. Countless scenarios such as these have and will continue to be written about alternative educational futures. They are not intended to be predictions, rather they are intended to stimulate the thinking of planners and policy makers in developing responsible and responsive means for identifying and dealing with future problems. We hope that by providing you with several descriptions of what education could be like in 1985 you will begin to ask yourself what it should be like and, therefore, which aspects of the system should be changed.

Each scenario is based on different sets of assumptions about function, planning, control, design, delivery, and evaluation of K-12 education. Perhaps after exploring the possible futures contained in the scenarios you will begin to ask yourself some questions about your own assumptions. The scenarios only depict what is possible. In order to move into the realm of the probable, we must be willing to ask ourselves some hard questions about our current assumptions and be open to change. Hopefully you have already begun asking questions about assumptions, perhaps questions similar to those which follow.

Do we really want the same results in education just delivered at lower costs?

Recently many well intentioned individuals in the Department of Education, the legislature, and the general public have indicated that what Florida educators should be doing is discovering a way to accomplish the same things we now are doing in the schools but for less money. Technology was believed by many to hold great potential for running schools better and cheaper. The Instructional Systems Development Center at Florida State University conducted an extensive review of the research literature on the cost reducing potential of technological applications in education, e.g., computers, programmed instruction, instructional television, instructional radio, management techniques (1).^{*} Unfortunately, under current operating assumptions none of the "things" of technology could be shown to be feasible methods of saving educational dollars in Florida. Some, such as computer assisted instruction could be expected to save student learning time. But as long as the assumption that schools should serve a custodial function is considered valid, the time savings cannot be converted into dollar savings.

When the definition of technology was expanded to include "process" as well as "things", the potential for obtaining not only reduced costs but also increased effectiveness became a possibility. The FSU team reported that following a systematic approach for identifying and solving problems in education could help us establish cost-effective, functional, valid, humane, and interesting schooling. It sounds exciting. But wait a minute, what was that about identifying problems? Don't we already know what the problems are? Shouldn't we just find a way to do better, faster, and cheaper what is now being done less well and slowly (2)? It depends upon whether we are looking for a means of more efficiently implementing old outcomes or a tool for making certain we have identified skills which graduates should have acquired in order to survive and contribute in society after exit from the schools. Given the task of finding cheaper means for K-12 education, the Florida State investigation suggested needs assessment as a process to first assure more valid ends.

Can schooling be made efficient or effective without a reassessment of educational goals?

A succinct account of the relationship between the terms "effectiveness" and "efficiency" in business has been provided by Peter Drucker:

^{*}Numbers in parenthesis () refer to references which document sources of quotations and the validity of projections. A complete list of supporting documents can be found at the end of this chapter.

Even the healthiest business, the business with the greatest effectiveness, can well die of poor efficiency. But even the most efficient cannot survive, let alone succeed, if it is efficient in doing the wrong things, that is, if it lacks effectiveness. No amount of efficiency would have enabled the manufacturer of buggy whips to survive.

Effectiveness is the foundation of success--efficiency is a minimum condition for survival after success has been achieved. Efficiency is concerned with doing things right. Effectiveness is doing the right things (3, p. 45).

We cannot assume that simply lowering educational expenditures will by virtue of poverty make schooling more efficient. Determination of efficiency in any human activity involves an examination of the relationship between means and ends. This relationship is meaningful only when costs of inputs (means) and values of outputs (ends) are known. Efficiency is maximized when the highest level of some desired end is achieved with a given means. The means in education are generally considered to be labor and capital acquired at some cost which can be estimated in dollars. The ends are multiple and can include areas such as intellectual attainment, vocational skills, socialization, value and attitude modification, and aesthetic sensitivity. It is clear that ends such as those listed above are really another name for classes of goals in our educational system. If we believe that efficiency is a relationship between means and ends which cannot be meaningfully considered until ends are clearly specified, and if we accept the notion of ends as reflections of the goals we hold for education we must conclude that schooling cannot be made more efficient without a reassessment and clarification of goals.

Educational goals must be reassessed in any attempt to make schooling more effective. Effectiveness is determined in relationship to some criteria and in the case of education the criteria should be the goals of the system. Before effectiveness, or "doing the right thing" as Drucker calls it, can be increased we must reach consensus on what schools should achieve with learners. Failure to clearly specify the ends of education in terms of learning outcomes can result in activities aimed at increasing effectiveness which could actually have the opposite effect.

A common suggestion for making education more cost-effective has been to remove all non-academic elements from the school experience. High levels of student achievement in cognitive areas such as reading, math, and science are considered by many individuals to be the highest priority goal for our education system. A simple way to increase effectiveness and reduce costs would seem to be cutting out all non-academic functions now served by the schools. However, a closer look at this possibility suggests that we move with caution.

Most parents, students, and taxpayers believe that a by-product of 12 years of effective schooling should be increased earning potential in the labor market. What does the research say about earnings and the influence of academic and non-academic aspects of the curriculum? Recent studies suggest that academic factors are not strong predictors of income and other measures of lifetime success. It has been suggested that many other factors such as socialization and character development are just as important in determining success upon leaving school (4). If increasing earning potential in the labor market is a valid goal for K-12 education perhaps we should think again about increasing cost-effectiveness by eliminating all non-academic aspects of the curriculum. Clearly we should not attempt to increase effectiveness in one goal area without taking into consideration the utility of the other goals of the system.

Can any activities be identified in Florida which indicate we are interested in reassessing educational goals?

Some readers may be convinced that the aims of Florida education are apparent, that there is widespread consensus on goals, and that those goals are valid and should not be changed. At a national level there is little agreement about what constitutes a relevant and worthwhile education. Indeed there is widespread evidence that among teachers, students, and the public at large there is much disagreement and discontent about the functions of the educational system. A large body of literature has arisen in recent years to articulate this discontent(5). In Florida we could consider some of the consequences of the Educational Accountability Act passed by the legislature in 1976, and then ask ourselves again if there is sufficient consensus on goals and objectives to begin improvement at the level of implementing promising cost reduction solutions.

The Educational Accountability Act of 1976 has mandated that the Department of Education develop minimum performance standards for various grades and subject areas especially the basic skills of reading, writing, and mathematics. Testing of such skills is to be carried out in grades 3, 5, 8, and 11. By July 1, 1977 each school district should have established a program for pupil progression based on mastery of minimum performance standards rather than social promotion. Particular emphasis is to be placed on mastery of the basic skills, especially reading, before promotion from the third, fifth, eighth, and eleventh grades. By 1978-79 each school district must have established performance levels for high school graduation which include mastery of the basic skills and functional literacy. Each district will provide certificates of attendance and differentiated diplomas which correspond to the varying achievement levels or competencies of graduates.

Transforming legislative intent of the act into educational reality promises to be a long and difficult process during which many assumptions concerning goals and objectives will be questioned. It is recognized that carefully selected standards are central to the success of the act, but whose viewpoints should be solicited in determining those

standards? Many different groups, with very different assumptions as to the purposes of education have indicated they have strong feelings about what kinds of competencies should be tested. Outcome expectancies could range from survival skills such as balancing a checkbook, reading a road map, and filling out an employment application to socialization and attitudes such as appreciating the benefits of a free enterprise system. We may begin to see increased questioning of the assumption that only educators are qualified to make judgments about what should be contained in the curriculum. If the goal of education becomes survival and contribution in the world beyond the classroom we will be required to go outside the schools to determine the required outcomes. We may even begin to see more and more individuals who are willing to question specific objectives of school if they do not relate to the survival and contribution goal.

The mere existence of the Educational Accountability Act indicates that we in Florida are interested in much more than delivering the same old product at a cheaper price. The intent of the legislation requires development of an educational system that is responsive to the needs of people. There is an expressed commitment to be assured that each student leaving high school is capable of economic and social survival and contribution. Full and successful implementation of the act will require changes in the following areas:

- Including an external referent, or going outside the schools to determine appropriate goals and objectives for the educational system,
- Changing some of our assumptions about the best way to plan, implement, evaluate, and fund education,
- Changing our focus from a teaching-oriented to a learning-oriented system.

We should be saying that we are interested not only in saving dollars but also in providing functional, valid, and humane schooling (6). The difficult task will be in convincing those individuals responsible for making decisions about the direction of Florida education that in order to do this we must be willing to question ends (goals and objectives) as well as means (ways of implementing goals and objectives).

Can schooling be improved if it is viewed primarily as a teaching process?

It is becoming clear that to change the rules and procedures of the certification function of a school is to also alter its linkage with other major functional activities such as instruction and supervision (7). If under the Educational Accountability Act students are expected to be come competent in basic and survival skills the schools must offer the kinds of learning experiences necessary to acquire such skills and the

opportunity to demonstrate competency. We may begin to see increased questioning of the assumption that schools are the best places to acquire knowledge. Perhaps other institutions in the community or places of business could be tapped as alternative centers of learning. We may also begin to see increased questioning of the assumption that education is a process focused on teaching. Emphasis on student attainment of specific outcomes, such as those in the Educational Accountability Act, and a more liberal attitude concerning appropriate environments for acquiring knowledge should force us to focus our attention on learning rather than teaching. We should seriously question the assumption that if we put an adult called a "teacher", aside with a group of same age children called "students", in a special building called a "school" where the teacher performs a special kind of activity called "teaching", the result will always be some measurable change in the students called "learning."

How can we determine whether or not schooling is as effective as it should be?

The difficulty level of the basic and survival skills tested under the Educational Accountability Act may also challenge some of our current assumptions about educational goals and objectives. In reading for instance, should a student be able to comprehend all printed materials he or she is likely to encounter? The reading level of a popular magazine might be sixth grade, that of a newspaper eighth grade, and that of some political materials beyond the college level. What then defines adequate reading skills or functional literacy? How comprehensive should the standards be? If they are too rigorous do we run the risk that only the most able students will be able to master them? Would some students give up without even trying? If they were too easy would many students question the value of staying in school after the standards had been met? Above all, if standards are set as minimums is there a chance they will be misinterpreted as maximums? Some Florida counties are already experiencing problems in determining appropriate cutoff scores in minimum competency testing for graduation. In one case when juniors were tested it was estimated that nearly 57 percent of the county's minority students would not receive diplomas. This was in contrast to only 8.3 percent of the non-minority students who failed the test (8). When a school system fails to provide an adequate learning environment for so many of its students the validity of goals and objectives of that system should be questioned.

Is it possible to bring about significant change in the educational system?

A review of the progress of education over the past 50 years seems to many individuals to be a glacially slow process; each achievement won by taking two steps backward for each three steps forward. Regardless of economic or instructional potential, the alternatives you read about in the preceding scenarios will not easily find their way into Florida schools. Why not? Why aren't educators more receptive in adopting

better ways of doing things. The literature on educational diffusion and dissemination tells us that creating awareness and motivation for any change is difficult. There is little empirical evidence on what strategy works best. Data from case studies on what happens when an innovation is adopted is growing, but why or how change takes place is still an area of theories rather than facts.

We may speculate about utilization barriers such as the tendency to rationalize certain aspects of present inefficiency, or a "show me that it works" attitude held by those who must be convinced by seeing the new idea work in a situation comparable to their own frame of reference. But perhaps the slowness of education to respond to change may also be related to more basic factors.

First, we have had a tendency in education to believe we can get by if we constantly change small pieces of the system to meet emergencies as they appear. In the words of Peter Drucker:

The educators still talk of minor changes, of adjustments and improvements. Few of them see much reason for radical changes. Yet education will in all likelihood be transformed within the next decades by giant forces from without. It will be changed, first, because it is headed straight into a major economic crisis(9).

The passage above was written eight years ago. We are moving dangerously close to the predicted economic disaster and some educators are still advocating making minor adjustments in order to avoid it. The approach is exemplified by studies looking for ways to do the same old thing easier, faster, and cheaper. Whether one calls it "planned muddling through"(10), "a strategy of disjointed incrementalism"(11), or "the art of the possible"(12), it has not been an effective way to bring about significant change in education.

A second factor related to the difficulty in bringing about significant educational change is seen in those educators who would like to "have their cake and eat it too." There remains a belief that all good things are compatible in education. We do not want to have to make difficult choices as to what outcomes the schools should take on as their mission. Looking at past educational change efforts it can be seen again and again how unwilling we are to sacrifice one goal for the sake of another. While everyone will agree that some of the things schools do are more important than others, there is little agreement as to what the less important functions are. If it is true as Peusch (13) suggests that in our society deviations in means are considered misbehaviors while deviations in ends are considered subversion, it should be no surprise that educators have been slow to question the usefulness of educational goals and methods as well. It is by far easier and safer to expect the schools to do everything, never questioning what is being taught or why it is important. Perhaps some of our goals are no longer useful. Perhaps some of our goals are not even compatible. Do we really believe we can bring about significant educational improvement by simply discovering new means to achieve less than valid goals?

What kinds of problems might be encountered in implementing the alternatives discussed in the preceding scenarios?

The technological applications you have just read about were chosen because it was believed they could provide certain benefits, either in efficiency or effectiveness, to the Florida education system. We should realize however that if adopted each alternative could have an impact on as well as in the system.

We know for example that applications such as those discussed in Chapter 3 will be most economical when the same materials are used by many students and when equipment is in operation continuously. Under these circumstances capital expenditures and initial investments can be distributed over a large base of users. Such requirements often result in centralization of decision-making for purchases, funding, curriculum selection, and resource allocation. The advantages of centralization can be seen in efficiency, lower operating costs, assurance of widespread use, and assurance of maintenance of minimum standards. The disadvantages of centralization can be seen in uniformity, reduction in the number of available alternatives, decreased responsiveness to local needs and desires, and reduction in the accountability of a local school to parents and the community.

Alternatives such as those discussed in Chapters 3, 4, and 5 also contain potential human and social problems. Any instructional technique, such as self-paced learning or programmed instruction may be criticized for ignoring social contact as a fundamental requirement for personal growth. While it may be recognized in passing that students develop greater independence and competence when they are allowed to progress at their own rate, such benefits are often treated as interesting extras rather than planned outcomes based on objectives.

The fact is that we have too seldom questioned the impact of techniques such as programmed instruction on the teaching staff, the students, or the entire organizational capacity of an educational institution. We don't know for example what the effects of instructional television are on socialization. In short, we have not given sufficient consideration to the side effects of the alternatives we are suggesting--especially when those side effects may be more powerful and enduring than the initial objectives of increasing learning or saving dollars.

Conclusion

Each reader has brought his or her own assumptions about what K-12 education should be like in Florida to the reading of this monograph. We don't really know your frame of reference or the place where you began. We can only hope that the scenarios have encouraged you to begin asking questions such as those outlined above and exploring new alternatives for providing effective, efficient and valid schooling. Hopefully after reading this monograph you will return to your own assumptions and see them in a new light for the first time.

We shall not cease from exploration, and
the end of all our exploring will be to
arrive where we started and know the place
for the first time.

T.S. Eliot

REFERENCES

1. Stakenas, R. G., & Kaufman, R. Costs and effectiveness of technological applications in education. Tallahassee: Florida Department of Education, January, 1977. (STAR Project No. 76-061)
2. Mesthene, E. G. Instructional technology and the purposes of education. In Tickton, S. G. (Ed.) To improve learning. New York: R. R. Bowker, 1971.
3. Drucker, P. Management: Tasks, responsibilities, practices. New York: Harper and Row, 1973.
4. Bowles, S. Understanding unequal economic opportunity. American Economic Review, 1973, 62(2), 346-356.

Bowles, S., & Nelson, V. The 'inheritance of IQ' and the inter-generational reproduction of economic inequality. Review of Economics and Statistics, 1974, 56(1), 39-51.
- Giutis, H. Education, technology, and the characteristics of worker productivity. American Economic Review, 1971, 61(2), 266-279.
5. Goodman, P. Compulsory miseducation. New York: Horizon Press, 1962.

Holt, J. How children fail. London: Pitman, 1964.

Illich, I. D. Deschooling society. New York: Harper and Row, 1971.

Kozol, I. Death at an early age. Boston: Houghton Mifflin, 1967.

Neill, A. S. Summerhill. London: Gollancz, 1962.
6. Kaufman, R.A. Educational system planning. Englewood Cliffs, N.J.: Prentice Hall, 1972.
7. Spady, W. G., & Mitchell, D. E. Competency based education: Organizational issues and implications. Educational Researcher, 1977, 6(2), 9-15.

8. Keefer, C. Panels seek to improve test scores. Palm Beach Post, February 21, 1977, p. 34.
9. Drucker, P. F. The age of discontinuity. New York: Harper and Row, 1969.
10. Kahn, H. The prospects for mankind. Hudson Institute Report H1-1648/4-D, 1972.
11. Braybrooke, D., & Lindblom, C. E. A strategy of decision. Glencoe, Ill.: Free Press, 1963.
12. Butler, Lord R.A. The art of the possible. London: Hamish Hamilton, 1971.
13. Reusch, I. Knowledge in action. New York: J. Arronsen Publishers, 1975.

Chapter 8

PARAMETERS OF COST REDUCTION FOR K-12 SCHOOLING

by

Pamela Eaddy

Introduction

Quite possibly we may be in the first stage of a long twilight in education--an evening twilight, not a morning twilight--which together with the now familiar diminished public confidence in education, will consist of markedly reduced financial support, fewer students, lessened quality, and curtailed educational opportunities. . . There is clear and present danger that unless we work hard for our mutual cause, unless we interpret in many wise ways to the public what it is we are doing and why it deserves the high priority, unless we plan ahead and have others do so, unless we make the most efficient and economical use of the resources we have, unless we lead instead of simply administering the following out front, we are in for a long period of gradual decline (1, p. 677).*

The statement above was made by E. B. Nyquist describing the New York education system. It is a description with which educational leaders in most states, Florida included, could easily identify. A climate of pessimism if not actual despair pervades many state departments of education. At the national level prospects do not appear much brighter. Data indicative of an impending crisis are abundant. The fraction of the Gross National Product consumed by education has doubled in the last 25 years and some economists estimate that educational expenditures will be \$15 billion dollars greater than revenues by 1980-81 (2).

Although new taxes were approved by the 1977 Florida legislature it does not appear the additional revenue generated will be capable of meeting the continually spiraling costs of providing educational programs and services. Financial prospects for the years ahead appear bleak. Taxpayers are not expected to continue supporting at higher levels each year a public service that seems to be incapable of demonstrating effectiveness or efficiency. Reports of the inability of graduates to demonstrate basic communication and computational skills, declining test scores, and difficulty experienced by graduates seeking employment or continuing on in higher education have made the public especially critical of the system as it is currently operating.

*Numbers in parenthesis () refer to references which document sources of quotations and the validity of projections. A complete list of supporting documents can be found at the end of this chapter.

At the same time schools have been hit with high levels of inflation in operating costs they have also begun to feel the impact of a transition in values and beliefs concerning the proper function of public education in society (1). The following events are indicative of the changing climate in which public schooling across the nation finds itself today.

- Court proceedings involving equal opportunity and equal access to public schooling
- Emphasis upon the consideration of cultural and racial diversity in designing and providing educational experiences
- Increased demands for accountability
- Expansion of educational programs and services provided to serve special groups such as the disadvantaged and handicapped
- Growing public concern over failure of schools to provide basic communication and computation skills required for survival in society
- Discussions of the feasibility of full state funding of public schooling
- Impact of unions in determining salaries, administrative practices, and teacher duties and responsibilities
- Increase in federal regulations related to the provision of public schooling at the state and local level

The net impact of events such as those listed above is felt by public school systems struggling for survival in an era of financial stringency with demands for expanded services, increased relevance, evidence of accountability, and more humane education all vying for attention.

Earlier chapters in this report have suggested that state funding for public schooling in Florida cannot continue to increase. Analysis of all available forecasts seems to lead to one conclusion--educational expenditures will be substantially reduced by 1980. There are many areas in the current system in which costs could be reduced and there is often more than one strategy that could be followed to reduce costs in a particular area. The scenarios presented in this report have provided examples of how alternative cost reduction strategies in several areas could be implemented in Florida.

The purpose of this chapter is to focus upon the choices that will confront educational planners when alternative cost reduction strategies are considered for implementation and the possible long-term and unanticipated consequences of making certain kinds of choices.

Selecting Cost Reduction Strategies: Part of a Rational Planning Process

When the public believes that something is wrong with a social institution--as apparently many believe is the case with public schooling--the normal response is to fix it piecemeal (3). Herein may lie a partial explanation for the failure of many educational innovations to result in significant change in the direction desired. Successful planned change is dependent upon viewing educational problems in their entirety with all ramifications, interior interactions, and exterior connections considered (4). Any effort to save money through intensive analysis of only one aspect of the public school system, or failure to consider the political, social, and economic consequences of actions will not be successful. The nature of the relationships among systems and among components within a system are such that any one of them taken out of context could only lead to a temporary solution.

It should not be assumed that implementation of any one of the cost reduction strategies reviewed in this chapter will avert the approaching crisis in public schooling. We must not become so overwhelmed by the existing situation that we settle for a few isolated adjustments and hope for the best. A systematic analysis of educational needs and priorities should become the basis for selecting cost reduction strategies that are comprehensive in scope, long-range in projection, and statewide in involvement and participation.

The results of past educational changes that have just happened, or that have been random reactions to whatever force was currently placing the most pressure on the system, illustrate the necessity for employing a more systematic and rational planning approach. The public is expressing dissatisfaction with public schooling because it appears to not be capable of meeting the present and emerging needs of students. Random selection of one of the cost reduction strategies in this report will not necessarily restore the confidence and support of the people.

Implementation of cost reduction strategies should be viewed as one step in a total planning process whose purpose is the identification and achievement of agreed upon educational goals. Within this planning process a rational approach to selecting among alternative cost reduction strategies should include consideration of the larger social system of which education is a part and significant other subsystems which could influence implementation. Piecemeal or expedient action does not usually bring about effective resolution of problems and, in the long run may even tend to worsen existing conditions.

Nature of the Crisis: Efficiency or Effectiveness?

Legislators criticize wasteful management of funds and taxpayers insist that costs be more closely related to outcomes. Finding ways to make education more "productive" and "efficient" has become the theme of educational planners. Alternative strategies for reducing costs are debated and analyzed apparently based on the assumption that finding a cheaper way to do what is being done now will assure survival. The demand that schools become more "businesslike" is frequently heard (5). Some observers have suggested that educational costs per students

could be reduced by a quarter or even a half by applying the principles of business management (6).

For many individuals increasing efficiency means simply cutting costs. Can we really expect all educational problems to be resolved by finding ways to spend less money? The writers of this report believe that consideration of efficiency only in terms of dollars saved and neglect of the more fundamental concept of effectiveness could lead planners into the position of making Faustian bargains they will later regret. The approach that is adopted today simply because it is a cheaper way of doing things may have far reaching consequences in terms of quality of schooling and preparation of graduates tomorrow.

The writers of this report believe that the concepts of efficiency and effectiveness are closely related. Instead of the narrow interpretation of saving money, it is proposed that efficiency involves a relationship between means and ends. It can only be maximized when a specified end is achieved to the greatest possible degree with some given means. Bowen and Douglas have expressed the relationship well:

Merely because a given educational method results in lowered cost per student does not prove that it is more efficient unless it is agreed that there has been no qualitative deterioration of output (or at least a less than proportional deterioration). If one could measure efficiency only in terms of cost per student, as many observers seem to imply, there would be no difficulty whatever in improving efficiency. It would always be possible to spend less, and maximum efficiency would be reached at zero expenditures. The efficiency problem is to alter favorably the ratio of two variables, cost and quality. The best of all possible worlds exists when it is possible to cut cost and raise quality at the same time (6, p. 27).

The explanation given by Bowen and Douglas suggests that quality of output desired from the educational system must be determined before attempts are made to increase efficiency. It is the quality of educational output that is being considered when the term "effectiveness" is used. Assessment of effectiveness requires that educators ask themselves what kinds of competencies are required now and will be required in the future for successful participation in the world after leaving school. They must also determine to what extent opportunities are being provided to acquire those competencies, how many students are currently mastering the competencies, and what impact implementation of various cost reduction strategies will have on future learning outcomes.

In the words of Peter Drucker, "Efficiency is doing things right. Effectiveness is doing the right things" (7, p. 45). Failure to recognize the relationships between these two concepts, to deal with them simultaneously, and to look at quality as well as cost of education could result in bargain priced disaster.

How can we increase effectiveness? How can we be assured that we are doing the right things before we look for ways to become more effi-

cient? It is suggested that any attempt to increase efficiency and effectiveness must be built upon an assessment of the goals and objectives of an educational system.

Goals, Objectives, and Cost Reduction Strategies

Based on an understanding of the concepts of efficiency and effectiveness presented above, alternative cost reduction strategies should be considered in terms of three criteria:

- Potential for expenditure reduction
- Relationship to basic goals of the system
- Potential impact on activities designed to facilitate mastery of priority objectives

Even a cursory review of educational literature over the past decade provides much evidence concerning the disagreement that exists concerning appropriate goals for education and the kinds of objectives students should be required to master. The lack of consensus on goals and objectives is a major limitation in selecting and implementing acceptable cost reduction strategies. Whether or not a particular cost reduction strategy is declared acceptable on the basis of the three criteria listed above depends upon the set of goals and objectives considered valid by an individual or group in society. In discussing the needs of elementary and secondary schools Ziegler has described the importance of consensus on goals in the current educational system as follows:

Unquestionably the school is the handmaiden of society, but society today is extremely unclear in its charge to the schools. One cause of ambiguity might be assigned to the view that American society is not a monolithic and homogeneous entity but rather a spirited and sometimes freewheeling conglomeration of social forces frequently in conflict. The school that attempts to satisfy all of these forces usually succeeds in satisfying none and is thereby branded a failure. But a failure at what? Who shall ever know whether the school is a success or failure until the goals of the school are clearly delineated and agreed upon by [all] segments of society (8, p. 812).

Development of valid educational goals is admittedly a difficult task and lest we think it is a problem unique to the current educational system consider the following situation described by Aristotle more than two thousand years ago:

There is no agreement as to what the young should learn, either with a view to the production of goodness or the best life, nor is it settled whether we ought to keep the intellect or the character chiefly in view. If we start from the education we see around us, the inquiry is perplexing, and there is no certainty as to whether education should be a training in what is useful for life or in what tends to promote goodness, or in more out-of-the-way subjects (36).

American education appears at times to operate on the assumption that the goals of the system are eternal; whatever we do we'll always do. It has been suggested that:

Educational planning in the United States has largely ignored the need to make qualitative assessments. It has accepted educational goals as given, then translated these goals into quantifiable targets. Even the occasional application of more modern "systems" techniques . . . appear to have provided neither a psychological incentive nor an intellectual tool for generating alternative goals, or for expanding the boundaries of conventional wisdom concerning the future directions education might take (9, p. 14).

There are techniques available for assessing the goals and objectives of public schooling. One of the most promising is needs assessment (10). Using this technique, a "need" is defined as the discrepancy between a present set of outcomes and a desired set of outcomes.

Depending on the kinds of data used and the assumptions made about what aspects of an educational system are open for change, Kaufman (11) has suggested that needs assessment procedures may be described as either "external" or "internal". Internal needs assessment is based upon the assumption that current policies, procedures, and operating patterns in public education are valid and unchangeable. An additional assumption made with this approach is that needs and problems should be identified and resolved solely within the confines of the public school system. In contrast, external needs assessment requires input from other significant systems in identifying societal goals for skills, knowledge, and values that should be provided by public schooling. The basic requirements for an external needs assessment include:

- Identification of needs in terms of gaps in learner competencies
- Participation of all partners in the educational enterprise (i.e., students, teachers, administrators, parents, taxpayers, legislators) in identification of gaps and prioritization of needs
- Use of an external referent (i.e., competencies required to survive and contribute upon exit from public schooling) to determine the relevance and validity of needs

In the past public education has perhaps had a tendency to view itself as an autonomous system. Needs assessment if used at all has usually been of the internal variety. Consequently the system has today come to be viewed as not being sensitive to the social, political, economic, or human requirements of the society in which it operates and to which it contributes. Current public dissatisfaction may be due in part to this neglect in determining goals and objectives.

Once valid goals and objectives have been identified they must be prioritized. Because only a limited amount of revenue will be available for public schooling low priority goals and objectives must be weeded out. This task can generally be expected to encounter some resistance from groups who see their special interests and programs threatened when some goals are assigned a low priority. As Drucker has pointed out:

The most difficult and most important decisions in respect to objectives are not what to do. They are first what to abandon as no longer worthwhile and second, what to give priority to and what to concentrate on. . . The decision about what to abandon is by far the most important and the most neglected (7, p. 192).

Although the external needs assessment procedure could be very valuable in identifying and prioritizing valid educational goals and objectives there are arguments against its use. Most of the arguments focus on the difficulty and imprecision involved in identifying competencies required for survival and contribution in the future and the undesirability of radical or large scale change in education. Such arguments certainly deserve careful consideration but it is suggested that unless steps are taken to identify valid goals and objectives the potential for significant improvement in efficiency and effectiveness will be lost.

Chapters 3, 4, and 6 of this report have explored alternative strategies for providing K-12 schooling in Florida at reduced levels of funding. A basic assumption for these chapters was that in order to reduce expenditures schools must spend less money. Each writer developed a scenario describing a cost reduction strategy based upon a different set of parameters. The purpose of this chapter is to review several of the cost parameters for K-12 schooling and discuss their implications for developing cost reduction strategies that are capable of improving both efficiency and effectiveness.

Summary of Projections for Educational Spending

The strategy planning unit in the Department of Education has forecast that expenditures for education will continue to rise at the same time real revenue decreases. Currently 60% of the General Revenue Fund (GRF) is required to support education and this figure is expected to rise to 74% in 1980-81 and 86% in 1985-86 if no new sources of revenue are identified (12). Increasing competition for use of the GRF to support other public services and a growing dissatisfaction with the quality of schooling being provided are indications that the financial situation may be reaching a stage of crisis.

Planners in the Florida Department of Education tell us that if we are to survive in the decade ahead we must be prepared to reduce expenditures for schooling at the K-12 levels. In order to prevent spend-

ing for education from rising above 60% of the GRF by 1985-86, expenditures must be reduced by 31% (12). The authors of the scenarios presented in Chapters 3, 4, and 6 have described strategies which could result in expenditure reductions of at least 20% by 1980-81.

Identification of Areas with Greatest Potential for Expenditure Reduction

In order to identify areas with the greatest potential for reducing costs an analysis was made of current expenditure patterns. The reader may refer to Chapter 1 of this report for a complete presentation of the analysis. It was shown that among the nine categories of educational expenditures, instructional costs represented 58% of the total budget. No other category alone accounted for greater than 12% of the budget. Proceeding on the theory that the best place to begin cutting back is where the most money is currently being spent, instruction is the obvious area for investigation.

A closer look at the category of instructional costs reveals that 68.6% is currently spent on teachers' salaries and related benefits. The salaries and benefits are generally assumed to be based upon the amount of time an individual is engaged in the activity called "teaching". Wages paid are not usually viewed as being dependent upon quantity of school output (number of students served) or quality of school output (amount of student learning). The term "labor intensive" is often used to describe service oriented activities such as education in which a significant proportion of expenditures is used to pay wages to workers. The implications of labor intensive organization for implementing cost reduction strategies in schools will be examined in a later section of this chapter.

Taking into consideration the current expenditure patterns and operating policies in which large amounts of money are paid to teachers in compensation for time spent with students there are three alternatives that could be considered for reducing educational costs:

- Reduction of total expenditures for teacher salaries
- Reduction of total time schools must serve students
- Practice of better management of current staff and facilities.

Reduction of Total Expenditures for Teacher Salaries

Two approaches to reducing expenditures for teacher salaries could be considered:

- Reduce all salary levels
- Reduce the number of teachers hired

Reducing salary levels. The approach of reducing all teacher salary levels would make it possible to retain current staffing patterns and continue to offer the same programs and services now provided. Any strategy incorporating this approach must take into consideration the recent developments in Florida in unionization and collective bargaining. It is possible that attempts to cut salaries would meet with strong organized resistance. It is also possible that the success of the state in attracting competent teachers would be harmed by salary cuts. The teaching profession in Florida has already experienced a decline of 14.6% in real income in the past decade, a figure higher than that in any other state (13).

Reducing the number of teachers hired. Several approaches to reducing the number of teachers hired could be incorporated into a cost reduction strategy. Four will be briefly described below:

- Increase class size
- Reduce the number of programs offered
- Reduce the student population to be served
- Integrate curriculum offerings

Increasing class size. Recent reviews of the research literature suggest that increasing class size does not reduce student achievement (14). The average class size in Florida schoolrooms in 1974-75 was 24.6 for grades K-3, 26.0 for grades 4-10, and 22.9 for grades 11-12. It has been estimated by the Department of Education that by 1980-81 around 27 million dollars could be saved if class size in grades K-12 were increased by one student. An increase of two students would result in a net savings of around 52 million dollars. Projections for the year 1985-86 indicate a savings of around 29 million dollars if classes were increased by one student and 56 million dollars if increased by two students (12).

Strategies incorporating this approach should take into consideration the relationship that exists in the mind of the general public and many teachers between class size and student learning. It is widely believed that the best learning environments are those in which teachers are required to supervise a very small group of students. The logic of this argument usually involves the benefits of increased individual attention received by students in small classes. Regardless of the failure of recent research to confirm the superiority of small class size, it would probably require careful planning to implement a strategy that seemingly violates a widely held and seemingly logical belief.

Use of this strategy may also involve conflicts with unions. In some states teaching contracts now specify the maximum number of students for whom a teacher may be held responsible at a given time.

The estimates of class size given above were reported by the Department of Education in terms of "average" numbers. Many classes are larger and many are smaller than these figures. Using class size in-

creases in a cost reduction strategy will require planning that includes consideration of the factors behind average class size. A simple mandate to increase the size of all classes by some specified number could result in very large classes becoming larger and very small classes remaining small. Small classes in some instances could be due to the population density of the school district. The potential of increased class size as a cost reduction strategy must take such factors into account if it is to be successfully implemented.

Reducing the number of programs offered. A reduction in the number of programs offered could also lead to lower expenditures for teacher salaries. For every program cut from the school curriculum a teacher required for that program could be eliminated from the payroll. Talk of eliminating the "frills" such as art, band, physical education, and foreign languages and the recent popularity of "back-to-basics" movements can be seen as examples of approaches to cost reduction employing this strategy.

Implementation of cost reduction strategies in this category may encounter difficulties due to public disagreement over what should stay and what should be eliminated from the curriculum. This disagreement is related to the problem described earlier concerning lack of consensus over goals for the educational system.

There is one major question to ask when choosing curriculum: What do we want our children to become? If we translate this question into somewhat more operational questions, these would include: What do we want our children to come to value? What do we want them to be able to feel and see and hear and smell and touch? From what do we want them to learn to get pleasure? What do we want them to understand about themselves and the world of nature and man? How do we want them to behave toward other human beings? To what do we want them to be inclined to commit themselves? What technical abilities do we wish to cultivate in them? (15, p. 23)

The technique of needs assessment described earlier has great potential for implementing cost reduction strategies based on cutting programs out of the school curriculum. Low priority programs can be eliminated from the curriculum and available revenue used to strengthen programs that teach competencies that have been validated against external survival and contribution criteria. There is a tendency for the goals of the educational system to become equated with acquiring knowledge in the program areas traditionally taught in schools. It is assumed that the existence of all programs in the curriculum can be justified on the basis of meeting some goal or objective. In reality the lack of specificity in most goal and objective statements prevents precise linkages between ends and means. Many programs and activities are subject to criticism and have become prime candidates for elimination because it cannot be shown how they contribute to any goal or objective of the system.

The feasibility of program elimination as a cost reduction strategy would be increased if planners could match learner skills and compe-

tencies required to meet system goals and objectives with programs included in the curriculum. Programs that could not be shown to contribute to the development of critical skills and competencies would be the logical targets to cut back. In the era of reduced expenditures ahead we may not be able to afford the luxury of assuming that all programs in the curriculum are justified. Needs assessment is a technique that could help us in verifying which programs actually enable students to meet valid learning objectives and which programs are being retained simply because they have become objectives in themselves.

The strategy of program reduction could also be applied to special categories of instruction. It has been estimated that one-fourth of the additional revenues which will be required for education will be due to expanding programs to serve exceptional student, vocational, and adult populations (12). The Department of Education estimates that maintaining the funding of all such programs at the 1974-75 level could result in savings of 173 million dollars by 1985-86. Expansion of only the exceptional student program could save 110 million dollars. Limiting vocational program funding to 1974-75 levels could result in a 90 million dollar budget cut (12).

A cost reduction strategy based on limiting the growth of programs in exceptional student, vocational, and adult categories should take into consideration the factor of federal regulations in these areas. State Boards of Education are often required by law to provide instructional programs and services to special groups of the population (16). Failure to meet minimum standards or comply with guidelines in programs offered can result in withdrawal of federal funds from a state. Savings in state expenditures should be carefully weighed against potential loss of federal dollars if this strategy is implemented.

Reducing the student population to be served. Reduction of the number of students served by the schools could be used as an instructional cost saving strategy by lowering expenditures for teacher salaries. Assuming a fixed pupil-teacher ratio, the elimination of students from the system could be accompanied by an elimination of the requirement for teachers for those students. An approach frequently suggested for reducing the student population to be served involves abolishing kindergarten and/or the twelfth grade. The Florida Department of Education has estimated that by 1985-86, 38 million and 52 million dollars could be saved by eliminating respectively kindergarten and the twelfth grade (12).

Any cost reduction strategy based on eliminating kindergarten must deal with the growing amount of research evidence which seems to indicate that early childhood training is very important in later intellectual and social development. The emphasis placed by Bloom (17) on early training and development marked the beginning of a period of expansion in kindergarten programs across the nation. A survey taken in 1975 found that 45 states provided some type of kindergarten program (18). Some educators have suggested that any amount of money saved today by not providing instruction for four and five year olds would be required at some later date to provide remedial programs and diagnose and treat learning problems that would have been less serious if caught at earlier stages (19, 20).

Focus on elimination of the twelfth grade as a cost reduction strategy would require development of a method for handling students who exit the public school system a year earlier and find themselves in an already crowded labor market or competing for placement in occupational training and higher education programs. Regardless of its success or failure in other areas, public schooling does keep a large portion of the population from adding to the unemployment statistics.

A cost reduction strategy including elimination of the twelfth grade should also take into consideration the ability of younger students to make important decisions concerning life and career plans. Strong guidance and counseling services and well developed career education programs may be required to assure success of this strategy.

Integrating curriculum offerings. An approach to reducing the number of teachers hired which has received limited investigation is that of offering instruction in more than one subject at a time. Classes arranged by subject area with a different teacher for each may not be the most effective or efficient way to deliver instruction. It may be possible to teach art and history and English at the same time. If so, one teacher could be hired instead of three.

Such an approach sounds promising for reasons other than cost savings. It also holds potential for making school learning more meaningful to students. Life is not neatly divided into boxes with problems identified and labeled by subject area. Emphasizing the relationships between knowledge and skills in different subject areas could enhance the value students place on school learning and allow them to see how it can be used to solve problems in the world outside of school.

Implementation of cost reduction strategies based on integration of curriculum offerings should not be initiated until the availability of personnel qualified to teach more than one subject and the certification standards set by the state are examined. It is also expected that this approach will have greater potential for lower grade levels and in highly related subject areas. It is not proposed that money can be saved by teaching Chaucer and plane geometry at the same time but there are many other areas in which combinations could be made and should be considered.

Reducing the Amount of Time Schools Must Serve Students

Schools have been described as serving five basic functions:

- Instructional
- Socialization
- Custodial
- Evaluative
- Selection (21)

It is possible that elimination of one or more of these functions could lead to a reduced amount of time teachers must spend with students. Since our educational system is labor intensive with teacher wages based on time spent rather than quantity or quality of output produced, it is logical to propose a cost reduction approach based on reducing time teachers spend with students.

Which of the functions listed above would it seem most logical to eliminate? The instructional and socialization functions are so much a part of our definition of what a school should be they are probably unlikely candidates for elimination. Some educators would point out that not enough time is being spent on these functions anyway. In a recent survey taken in Oregon elementary teachers reported that they spent only about 30% of their time on activities related to instruction (22). High school teachers in New York were found to spend large amounts of time each day on duties such as hall patrol, record keeping, clerical work and lunchroom supervision (23).

What about the evaluative and selection functions? A close look at policies and procedures in the current system has prompted many critics to ask whether schools have ever performed these functions. Graduates are not licensed on the basis of a competency evaluation. Attendance is required only until the end of a school year regardless of whether a specified minimum level of competence necessary for survival and contribution in society has been achieved. Schools cannot be described as either selective or contractual because they assure neither the graduate nor the future employer of mastery of specific competencies at predetermined levels.

What functions remain? The custodial function, also frequently called "babysitting". Most students are required to attend school from eight o'clock till three o'clock for nine months of the year. As long as the students are in attendance we must pay teachers to provide supervision. It makes little difference whether students are engaged in learning activities or just logging time when teacher wages are considered. Estimates of the division of time between instruction and custodial duties has led some critics to suggest we are buying cheap babysitting and expensive instruction.

Consideration of any cost reduction strategy based upon eliminating the custodial function of schools in order to convert time savings into dollar savings should include recognition of the difficulty of changing long standing practices generally sanctioned by the society. Children in school are not roaming the streets and they are not underfoot at home. Parents know where they are and feel reasonably secure about their safety. With the recent return of many women to the work force schools also provide an economical child care facility. Advocates of a cost reduction strategy that proposes to eliminate the custodial function of schools should be prepared to discuss with parents and taxpayers what kinds of provisions could be made for its replacement. Possibilities include a return of responsibility to the family, an extended role for existing social agencies and community services, or greater integration of schooling and work opportunities.

Using Instructional Delivery Systems that Permit Savings in Learner Time

Some instructional delivery systems such as programmed instruction and computer assisted instruction have been shown to be capable of reducing by about one-third the time required for learning (14, 24). The success of cost reduction strategies based on this approach will depend upon the receptiveness of society to elimination or substantial reduction of the custodial functions performed by the schools. Teachers are paid to supervise students for the total amount of time spent in school. When this amount cannot be changed, instructional time savings are often simply transferred to custodial time. Teachers in the current system spend the same amount of time with students and therefore receive the same wages regardless of whether activities involve instruction or caretaking or whether or not students learn or just mark time. As long as custodial care is considered a legitimate school function, instructional time savings cannot be converted into dollar savings through a reduction of teacher wages.

Implementation of this strategy to reduce costs should be based upon a consideration of whether or not new time saving instructional delivery systems are designed to address as broad a range of school objectives as the traditional methods they replace. Traditional methods may, for example, meet objectives for socialization and development of communication skills in addition to mastery of intellectual skills. Most of the research documenting decreased learning time using new instructional delivery systems is based solely on the mastery of intellectual skills. Comparison of the total cost per hour of instruction for traditional and new instructional methods may overstate the costs of traditional instruction which is able to achieve more kinds of objectives than the newer methods.

Managing Resources More Efficiently

There are numerous approaches to reducing costs by managing resources more efficiently. Use of paraprofessionals, year-round schooling, differentiated staffing, double sessions, budgeting revisions, and consolidation are only a few of those that have been tried. Implementation of cost reduction strategies in this category should be based on a consideration of the total system impact of changing operating policies and procedures. The results of a single operating or budget policy change can reach to the level of the classroom and influence the way in which instruction is delivered. It may actually require additional expenditures if instructional effectiveness is to be maintained.

Consider the strategy of year-round schooling which has often been suggested as a means of obtaining more economical use of building space and greater benefit from associated maintenance costs. Many approaches to year-round operation have been tried. Some of the most successful include the 45-15 Plan, the 50-15 Plan, Quinesters, Trimesters, Concept Six, and the Personalized Continuous Year Plan (25). Most school systems adopted the approach on the basis of potential for saving money but soon discovered that it also required extensive revisions in instructional procedures. Development of individualized curriculum, retraining of teachers for the individualized classroom, and revision of graduation

standards had to be carried out in most cases. Schools frequently reported that over a two to three year period total expenditures increased rather than decreased due to the curriculum development and inservice activities. Although some school boards voted to discontinue year-round operation, others maintained it in spite of increased costs due to satisfaction with the improved learning environment in the individualized classrooms (26, 27).

Similar fates could be described for many cost reduction strategies based on better resource management. Planners should recognize that impact may reach deep into the educational system and may require changes in subsystems that reduce or destroy initial cost reduction potential.

Duration of Commitment to a Cost Reduction Strategy

Any of the strategies briefly described above could be used in the development of a cost reduction plan for K-12 schooling in Florida. Three such strategies were presented in Chapters 3, 4, and 6. Hopefully you are now aware of some of the constraints each writer faced in developing means for incorporating the strategies into the Florida school system. Impact upon effectiveness and feasibility of implementation were always factors which had to be taken into consideration. An additional factor which should be considered in planning for implementation of any cost reduction strategy is the duration of commitment to the approach.

High add-on costs are often experienced when a cost reduction strategy is initially implemented. This is especially true in those cases where a labor intensive method such as traditional instruction is replaced by a capital intensive method such as computer assisted instruction. Purchase of teachers' salaries and related benefits represent recurring costs that remain relatively stable over long periods of time. Purchase of a computer represents a high initial capital investment but low recurring costs. In order for dollar savings to be realized for capital intensive methods, initial add-on costs must be prorated over a long period of time. New methods cannot be expected to result in large budget savings during the first few years of operation. It has been estimated that some innovations should not be expected to reach full cost reducing potential before a period of 10 to 15 years (28). We should ask whether we in Florida are willing and can afford to make such long term commitments.

Economies of Scale

The cost reduction potential of all of the strategies discussed in the report is dependent upon the size of the unit under consideration--individual school system, district school system, or state school system. Some approaches especially those classified as capital intensive, become more economical when they can be applied to larger units simply because initial add-on costs can be distributed over a larger number of users.

Many states have found that the constraints of economies of scale require development of a centralized resource allocation and decision making system. Some cost reduction strategies are not economically feasible or operationally manageable at a district or school level. It is widely believed that he who pays the piper in education also calls the tune. Some individuals have expressed concern over state financing of innovative programs that could lead to gradual state control of local school systems. Public concern over the issue of local autonomy is evidenced in current debates over proposals for full state funding of education.

The 1977 Legislature rejected a plan to eliminate the authority of counties to levy up to 10 mills (\$10 per \$1000 of value) and at least 6.4 mills on property for support of schools (29). Voters convinced their legislative representatives that local school systems had already lost too much authority for the 51.5% share of public schooling costs assumed by the state.

The issue of local autonomy should not be underestimated when selecting cost reduction strategies. We should be prepared to consider the extent to which parents and taxpayers are willing to give up local control of the schools in order to achieve a reduction in expenditures.

The Intertwining of Costs and Standards

It was suggested earlier in this chapter that the selection of a cost reduction strategy should include consideration of impact on student learning. In order to select a strategy with high potential for both reducing costs and maintaining or increasing effectiveness, planners must have access to valid and reliable measures of learning outcomes. They should be able to determine effectiveness of present instructional efforts and estimate how a particular cost reduction strategy could increase or decrease that effectiveness. The difficulties of reaching consensus on goals and defining outcomes for K-12 schooling were discussed earlier in this chapter. An equally challenging task involves measuring attainment of outcomes once they have been specified.

Assume for a moment that valid goals and intended outcomes can be identified for K-12 schooling. What methods exist for measuring effectiveness in attaining the goals? The most commonly used indices of educational effectiveness have been standardized tests.

Widespread concern has recently been expressed at the steady decline of standardized test scores, most notably the Scholastic Aptitude Test (SAT). The responses offered to explain the declining test scores have usually fallen into one of four categories:

- Schools are doing a poorer job
- Other factors within society can be identified to explain declining scores
- Test scores and school grades are not related to life success
- Standardized tests are no longer valid indications of educational outcomes.

The first reaction, that declining test scores indicate poorer performance on the part of schools, has been used to support the position of "back-to-basics" advocates. According to this point of view schools are not doing things the way they did back when test scores were higher. Lowering of standards, grade inflation, and lack of discipline are often cited as evidence of how the schools have become negligent in performing their duties.

Individuals in the second category have suggested that the public schools are being made a scapegoat for declining test scores. Numerous factors beyond the control of the schools are cited as possible causes of the decline:

- Curricular changes
- Organizational changes at school and district levels
- Compositional changes in secondary school retention
- Decline in the average number of days of school attended per year
- Decline in number of pupils in academic courses at all grade levels
- Drop of around 11% in English enrollments over a two year period
- Drop of around 7.5% in foreign language enrollments
- Decline in number of math courses taken per student
- Decline in enrollment in natural science courses
- Increase in teacher mobility
- Decrease in number of years of experience of teachers
- Increase in TV ownership and time spent viewing
- Reports by the National Institute on Drug Abuse that 8 to 14 year olds are the fastest growing group of drug users
- Increase in the number of working mothers.
- Increase in the number of illegitimate children. (30)

Perhaps one of the most interesting recent theories has been proposed by Robert Zajonc (31). He has suggested that later born children, especially those from large families, tend to have lower intelligence scores than first born children. SAT scores reached a peak in the early 1960's when many of those taking them were first and second born during World War II. The average scores began to fall as their brothers and sisters (products of the "baby boom") began taking the tests. Zajonc

believes that the decline of SAT scores can be satisfactorily explained by the phenomena of increased family size which reduces the amount of interaction between adults and children. With the return to smaller families he predicts we may see a rise in scores.

In March of 1974 the Research and Development Division of the American College Testing Program published a research report on the relationship between academic success and in-life success. Authors Munday and Davis illustrate the attitude toward declining test scores taken by the third point of view:

Put simply, the research by Holland, Richards, Hoyt, and their colleagues seems to demonstrate that success in school work is not related to success outside of school. Further, it implies that academic talent may be only one kind of talent, and of limited consequence in the real world (32, p. 2).

Standardized tests are accepted as valid indicators of academic ability under this point of view but the value of such ability in surviving and contributing in the real world outside the classroom is questioned. It has been suggested that cost reduction strategies selected on the basis of maintaining or increasing the kinds of abilities measured by standardized tests could actually result in decreased schooling effectiveness. It will not be easy for the public and many educators to accept the fact that good test scores are not synonymous with effective schools and life success but a few voices are already being raised:

Researchers have in fact had great difficulty demonstrating that grades in school are related to any other behaviors of importance--other than doing well on aptitude tests. Yet the general public--including many psychologists and most college officials--simply have been unable to believe or accept this fact. It seems so self-evident to educators that those who do well in their classes must go on to do better in life (33, p. 2).

A fourth point of view has raised additional questions concerning the validity of equating a decline in standardized test scores with decreasing school effectiveness. It has been suggested that construction, administration and interpretation of standardized tests is of such poor quality that any results obtained are at best meaningless. Critics have stated that:

- Much test content is unimportant or irrelevant
- The structure and format of tests is confusing and misleading
- The process of administering the tests is demeaning, wasteful of time, and counterproductive
- The application of statistics that result from test scores distorts reality
- Test results are often not used to help teachers improve student learning (34).

Are standardized test results valid indicators of schooling effectiveness? Evidence is growing which suggest that they are not. Selection of cost reduction strategies on the basis of maintaining or improving standardized test scores cannot be recommended as a sound planning procedure. Are other means of determining schooling effectiveness available? Criterion referenced testing is one approach with much to offer educational planners in terms of measuring and improving schooling effectiveness. In current educational literature criterion referenced testing has most often been discussed on the level of developing testing procedures in a specific class or subject area. The critical relationship between test items and instructional objectives, importance of absolute criteria as standards and use of results to direct additional learning activities for students has usually been emphasized. As an alternative to norm referenced testing, the approach has begun to change some of our basic assumptions concerning the definition of an effective educational system. Practices such as "grading on the curve", which predetermined less than satisfactory performance for a large number of students in any class are no longer as widespread as they once were.

Some individual school systems are making significant progress in developing alternatives to standardized testing. Interviews, observations on interactions with other students, and simulations of work situations are all being explored. For example, the New York State External High School Diploma is currently being made available through a series of interviews in which various life experiences of the candidate are assessed (35).

As our ideas about what constitutes effective learning have been changed by criterion referenced testing, so perhaps will our methods of measuring effectiveness of the larger educational system. The soundness of decisions concerning selection of cost reduction strategies will be greatly increased when standards concerning effectiveness are:

- Based upon student attainment of learning outcomes
- Related to survival, contribution, and success in life after leaving school
- Reported in terms of changes in student competencies attributable to instruction.

Conclusion

This chapter has attempted to outline some of the cost parameters, constraints, and assumptions under which the scenarios in Chapters 3, 4, and 6 were written. The major points covered are listed below:

- Florida must plan to reduce expenditures for K-12 schooling by at least 20% by 1980-81.
- There are many parameters which could be manipulated to develop cost reduction strategies.

- The current education system in Florida is labor intensive. The largest expenditures are for wages paid to teachers.
- Teacher salaries appears to be the category which holds the greatest potential for expenditure reductions.
- The custodial function of schools must be eliminated if time savings are to be converted into dollar savings.
- Cost reduction strategies should be selected on the basis of potential for dollar savings, feasibility of implementation, and impact on effectiveness.
- Effectiveness cannot be determined until goals and objectives are identified, prioritized, and stated in terms of learning outcomes.
- Learning outputs of schools must be related to useful performance outcomes in the society.
- Standardized tests do not appear to be useful measures of survival oriented learning outcomes.
- Effectiveness cannot be adequately determined until valid methods to measure attainment of learning outcomes are available.
- Shifting from a labor intensive to a capital intensive method of providing instruction may require long periods of commitment if dollar savings are to be realized.
- Shifting from a labor intensive to a capital intensive method of providing instruction may, due to economies of scale, require centralization of resource allocation and decision making.

The purpose of the chapters in this report has not been to predict but rather to inform the reader of the range of alternative futures available for education and discuss some of the possible long-term and indirect consequences. The writers believe that education is more likely to arrive at a desirable future if steps are taken to think and plan in a systematic and formal manner.

Many individuals view with alarm the financial picture developing for Florida's public schools. The approaching crisis appears to be close at hand. It is interesting to note that the Chinese symbol for crisis is written with two characters; one represents the borders of danger, the other represents opportunity. If instead of despair we approach the crisis ahead determined to analyze alternatives, select among them rationally, and plan wisely we may emerge with an educational system more efficient and effective than any before it.

REFERENCES

1. Nyquist, E. B. Disgruntledness, or education is no longer a money-splendored thing. Speech presented to the Mid-Winter Meeting of the New York State Council of School District Administrators. Albany, New York: January 29, 1976.
2. McBride, R. H. Where will the money come from? Financing education through 1980-81. Phi Delta Kappan, 1976, 58(3), 248-249, 253.
3. Stafford, B. Cybernetics and management. New York: John Wiley & Sons, 1964.
4. Mood, A. M. On some basic steps in the application of systems analysis to instruction. Socio-Economic Planning Science, 1976, 1, 19-26.
5. Callahan, R. E. Education and the cult of efficiency. Chicago: University of Chicago Press, 1962.
6. Bowen, H. R., & Douglas, G. R. Efficiency in liberal education. New York: McGraw-Hill, 1971.
7. Drucker, P. F. Management: Tasks, responsibilities, practices. New York: Harper & Row, 1973.
8. Zigler, E. Report of the Yale conference on learning in needs of elementary and secondary education for the seventies. Washington D.C.: U.S. Government Printing Office, 1970.
9. Ziegler, W. Some notes on how educational planning in the United States looks at the future. Notes on the Future of Education, 1970, 1(3), 14-16.
10. Kaufman, R. A. Educational system planning. Englewood Cliffs, N.J.: Prentice-Hall, 1972.
11. Kaufman, R. A. Needs assessment: Internal and external. Paper presented at the meeting of the Association for Educational Communications and Technology, Miami Beach, April 1977.
12. Florida Department of Education. Analysis of projected enrollments, expenditures, and revenues for public education in Florida 1974-75 through 1985-86. Author, July 1976.
13. Lewis, A., Nelson, J., Soar, R., & Troup, L. Social forecasting and educational planning. Gainesville: University of Florida, January 1977. (STAR Project No. R5-175)
14. Jamison, D., Suppes, P., & Wells, S. Alternative instructional media. Review of Educational Research, 1974, 44(1), 113-144.
15. Tumin, M. Teaching in America. Saturday Review, October 21, 1977, p. 23.

16. Hodenfield, G. K. Public schools must open doors to handicapped children soon. Tallahassee Democrat, June 16, 1977, p. 8.
17. Bloom, B. Stability and change in human characteristics. New York: Wiley and Sons, 1964.
18. Robinson, E. H., & Robinson, S. L. Early childhood education: Practice outpaces theory. Phi Delta Kappan, 1975, 56(8), 566-568.
19. Petrossian, N. D., & Werner, L. Early intervention for failure prevention. Catalyst for Change, 1976, 6(1), 10-13.
20. Bradley, E. Screen them early. Academic Therapy, 1975, 10(3), 305-308.
21. Stout, R. T., & Spady, W. G. Some criteria for assessing statewide reform: Can California RISE to the challenge? Paper presented at the annual meeting of the American Educational Research Association, San Francisco, 1976. (ERIC Document Reproductive Service No. ED 126 621)
22. Eaton, H. What do teachers do all day? Saturday Review World, June 1, 1974, p. 55.
23. Shanas, B., & Sherman, W. Comparative analysis of the high schools for fall term. New York: New York Board of Education, 1975.
24. Stakenas, R. G., & Kaufman, R. Cost and effectiveness of technological applications in education: A literature review. Tallahassee: Florida Department of Education, January 1977. (STAR Project No. 76-261)
25. Year-round education handbook. Sacramento: California State Department of Education, Office of Program Planning and Development, 1975. (ERIC Document Reproduction Service No. ED 113 799)
26. Year-round education dream and reality: A report of the national seminar on year-round education. Denver, Colorado: Colorado State Department of Education, 1975. (ERIC Document Reproduction Service No. ED 113 816)
27. Univer, I. O. Can year-round schools save money? American School and University, 1976, 48(9), 34-35.
28. Jamison, D., & Klees, S. The cost of instructional radio and television for developing countries. Stanford, Calif.: Stanford University Institute for Communication Research, 1973. (ERIC Document Reproduction Service No. ED 077 213)
29. Johnson, M. School control follows the dollar. Tallahassee Democrat, August 26, 1977, p. 1, 16.

30. Sapone, C. R., & Guiliano, J. R. The test score decline: Are the public schools the scapegoat? Educational Technology, 1976, 191(16), 227-236.
31. Zajonc, R. B. Family configuration and intelligence. Science, 1976, 191(16), 227-236.
32. Munday, L. A., & Davis, S. C. Variables of accomplishment after college: Perspectives on the meaning of academic talent. American College Testing Program Research Report No. 62. Iowa City: American College Testing Program Research and Development Division, March 1974. (ERIC Document Reproduction Service No. ED 092 000)
33. McClland, D. C. Testing for competence rather than "intelligence". American Psychologist, 1973, 28(1), 1-14.
34. What's wrong with standardized testing? Today's Education, 1977, 66(2), 35-38.
35. Maeroff, G. I. Education searching for testing alternatives. Tampa Tribune, May 1, 1977, p. 4.
36. Aristotle. Politics VII, 17. In S. Burnet (Ed. and Trans.) Aristotle on education. Cambridge: University Press, 1905.

EPILOGUE

The scenarios in Chapters 3, 4, and 6 may sound like dream worlds or fantasies to those who have labored long and hard in the vineyards of public education. To be sure, wishing does not make such visions come true. On the other hand, every item that was described and discussed in these "success" stories is based in reality; such examples exist in real school districts and in real classrooms today!

These scenarios have provided us with a glimpse of the future as "history". The purpose of writing such "histories" is to envision what the future might be like not as a prediction but as a desired state of affairs. And if we should come to like a particular version of a "future history", then we can begin to plan and work to make it come true. So why don't we go ahead and do it now in Florida? Obviously there are several conditions which must be met in order for any of these visions to become a reality. Let's consider some of them.

Reassess educational goals and objectives. Curriculum is the means by which the goals and objectives of education are achieved. A curriculum which addresses inappropriate or irrelevant goals is likely to produce learning outcomes that will benefit neither learners nor the society in which they will work and live. It should be clear that a curriculum which addresses inappropriate or irrelevant goals can be neither effective nor efficient.

If Max Wingo (1)* is correct, we are our own worst enemies insofar as curriculum change is concerned. Educational essentialists believe that the present goals and objectives are the correct ones so there is little to be achieved by reassessing them. If we are essentialist in our educational philosophy, then we will have great reluctance to actively engage in an externally-referenced needs assessment (6).

The technology of needs assessment is available and it works--that is if we are willing to make it work. So the first necessary condition is to be willing to spend the time and the effort required to determine which of our present goals and objectives are still useful and to identify new ones in order to prepare our youth to live in a world which will no doubt be very different from the one we have experienced during our own lifetime.

Create incentives for change. Writers such as Boulding (2) and Pincus (3) have pointed out that there are few if any incentives to motivate educators to adopt new procedures or effectiveness increasing strategies which are likely to save money. This comes about for two reasons. One is due to the nature of service "industries", the other to the nature of the budget allocation process itself.

*Numbers in parenthesis () refer to references which document sources of quotations. A complete list of supporting documents can be found at the end of this epilogue.

First of all, in a service industry such as education, "efficient and effective" management usually means control of cost. Being paid out of a budget allocation usually changes what is meant by performance. Effective "performance" in a budget-based institution usually means a larger budget. In business, customer satisfaction is the basis for assuring performance and results. In contrast, "customers" of education have at best only an indirect influence over the allocation and utilization of funds regardless of the level of satisfaction. In a sense, education is endowed with monopolistic powers. The "customers" have little choice regarding demands for better service. Taxpayers pay for education whether or not they want the services provided by it (4).

Secondly, the budgeting process itself provides few incentives for cost reduction. It is common practice for administrators to propose inflated budgets in order to be able to receive at least as much as was obtained during the previous year. Once the allocation is received, efforts are made to be certain that all funds are expended by the close of the fiscal year. Otherwise, surplus funds will be "swept" by the central office. If surpluses are found too frequently, then the school or department is usually in for a budget cut during the ensuing year.

As long as education is conceived of and operated as a budget-driven (rather than learner-driven) process, it will be difficult (if not impossible) to create incentive systems that will result in significant cost reduction and increased learner achievement. As pointed out in Chapter 8, effectiveness and efficiency are tightly intertwined and can only be studied and understood in terms of educational output, i.e., student performance. It should also be clear that judgments regarding accountability are intertwined with effectiveness and efficiency and must also be linked to indicators of performance. Therefore, any incentive systems that are intended to increase effectiveness, efficiency, and accountability must be related to student performance. Otherwise, education will become, in Boulding's (2) words, "a pathological sector of the American economy."

Conditions necessary to derive maximum benefits from educational technology. Let's recapitulate this issue by listing and then examining conditions under which maximum benefits can be realized from educational technology. These conditions include:

- Create an effective planning capability (5,7)
- Create an effective management capability (5)
- Create an effective means for monitoring the effectiveness and efficiency of instructional programs (5,7)
- Shift the emphasis from an instructional process orientation to a learning outcome orientation (5,7)

Let's look at each one in turn.

Regarding planning capabilities. Implementing significant cost reduction strategies will require kinds of planning and design that school districts have not ordinarily been accustomed to or accomplished. Cost reduction procedures, in turn, will require having to make changes that students, teachers, administrators, and the public have also not been accustomed to. All educational partners--students, teachers, and the public--will have to be "educated" to accept deep change. Planning plays a key role in this. Planning will take on some new dimensions if we are to be successful. Not only will there have to be planning to accomplish better that which currently goes on in schools and school districts, but additionally, educators will have to start looking at the educational requirements for determining what current skills, knowledges, and attitudes and what future skills, knowledges and attitudes will be required of learners when they legally leave our educational agencies. This will involve both an "internal" and "external" view of education and educational planning (6).

Adoption of newly developed instructional materials and procedures which show a potential for increasing efficiency and effectiveness will be an important step. We don't have enough time and money to allow each classroom teacher to design and develop each element of curriculum *de novo*. Teachers will have to be retrained to adapt available materials and procedures for local needs. Planning and design will play a key role in implementing new, more cost-effective methods and means.

Regarding management capabilities. More efficient use of existing resources will require more effective management and coordination within each school and each school district. Educational managers who once held an almost absolute authority over teachers now find this authority being eroded by collective bargaining and teacher unions. If new curricula and new learning systems are adopted, then teachers will have to become better managers too. Simply running a traditional instructional program will not be good enough. If teachers are to be held accountable for results based on specified learning outcomes and exit standards, then student achievement that is below performance standards will become the focus of systematic inquiry to determine how to raise learner performance to required levels--another task for which educational managers will have to assume responsibility. There is little question that significant cost reduction strategies will require structural change. Effective coordination, leadership, and human relations skills will be critical factors in the management of the deep change that will be required.

Regarding monitoring the effectiveness of instructional programs. The effectiveness and efficiency of educational programs cannot be systematically increased without some way to monitor learner performance. As Hanushek (8) has pointed out, we presently have no effective means for measuring educational outcomes. Therefore, effects produced by changes in resource allocation patterns or changes in technology cannot be detected, evaluated, and required adjustments made. This, then, brings us to perhaps the single most important requirement in order to derive full benefit from applications of educational technology--moving to an emphasis which is learner outcome based.

Table 1

RELATIONSHIPS BETWEEN PROBLEM SOLVING, EDUCATIONAL TECHNOLOGY AS A
PROCESS, AND TECHNOLOGICAL APPLICATIONS

A Problem Solving Process ^a	Technology as Problem Solving and Design	Technology as Hardware Applications
1.0 Identify problem (from needs)	Plan programs based on identified learner needs, needs of educators, and needs of society both currently and in the future	(There are no known instances of hardware equipment that can effectively accomplish this task)
2.0 Determine solution requirements and solution alternatives	Identify detailed performance requirements and identify possible ways and means to meet the verified needs	(There are no known instances of hardware equipment that can effectively accomplish this task)
3.0 Select solution strategy	Select the most effective and efficient ways and means to meet the verified needs	(There have been attempts to develop algorithms for media selection but they have not been as effective as informed human judgment)
4.0 Implement solution strategy	Design curriculum which is learning outcome oriented and directly related to needs identified in step 1.0 Design instructional delivery procedures	(There are no known instances of hardware equipment that can effectively accomplish this task) Use hardware-based instructional delivery systems such as ITV, radio, computers, etc., <u>if deemed effective and efficient, otherwise</u> use human and other nonhardware resources

Design procedures to monitor learner performance

Use test scoring machines, computer-managed data files, etc., if deemed effective and efficient, otherwise use human and other non-hardware resources

Design management procedures to implement and to coordinate all of the above

Use computer-based management information systems if deemed effective and efficient, otherwise use human and other nonhardware resources

Design and implement procedures to determine the effectiveness and efficiency of solution strategies in meeting identified needs

Use test scoring machines and computers to reduce data, computerized files to store data

5.0 Determine performance effectiveness

Evaluate the effectiveness and efficiency of the resources, curriculum, plan, programs and personnel

Use computer-based data analysis programs to analyze performance and cost data. Use human judgment to determine worth and to make decisions

6.0 Revise as required

Design and install methods, and procedures that will remove gaps observed in learner performance and/or increase efficiency of program operations

(There are no known instances of hardware equipment that can effectively accomplish this task)

^aSource: Kaufman, R.A. Educational system planning. Englewood Cliffs: Prentice-Hall, 1972.

Regarding a shift from teaching-oriented to learning outcome-oriented-education. If reassessing the goals of public education seems difficult, then shifting from a teaching-centered concept of education to a learning-centered one may seem well nigh impossible. Although this may be an overstatement, it is intended to point out the difficulty of uprooting a set of beliefs about the way education has been done for centuries. These beliefs will have to be replaced with concepts that appear to be radically new and different. What is actually involved is a shift in point of view.

Education will probably not change or improve very much as long as we believe that teachers must "teach". The fallacy of believing that teachers must "teach" is that teaching may have little or nothing to do with whether learners learn. Learning is something that happens inside of learners. So isn't it about time that we began to design classrooms as learning environments and to establish what we want learners to be able to do rather than to begin--one more time--by saying what teachers will "teach"?

Well then, if we shift from teaching to learning, what will we do with the teachers? Given such a shift, teachers will have just as much, if not more, to do and it will be much more intellectually and individually satisfying. They will be expected to motivate learners to achieve new and more intellectually satisfying outcomes. It may even come to pass that teachers will finally be given an opportunity to do what only human beings can do--humanize and socialize other human beings. At the present time, teachers are so busy presenting information and correcting work sheets that there is precious little time to socialize and humanize students. The rationale for substituting technological applications for human teachers would be to free them to do what only humans are capable of doing. Will it come to pass that by considering how people and machines can work together to educate the young, that we will discover what is unique about being human? This is not likely to happen as long as teachers teach toward unquestioned (and perhaps outdated) goals while using instructional methods which promote the development of passive, information saturated learners.

Placing emphasis on student learning outcomes is one of the most effective launching points for educational improvement and is pivotal for helping educational institutions to change for the better. Writers such as Drucker (4) seriously question whether an organization such as a school district can sensibly decide between one course of action or another if it does not first understand the kinds of outcomes it seeks to achieve. However, even well intentioned educators will have to be prepared to deal with the pitfalls that are commonly encountered when learning outcomes are considered. These pitfalls include:

- Difficulty in attaining agreement about the outcomes
- Difficulty in assessing whether the outcomes have been achieved.

As pointed out in several of the earlier chapters, present standardized tests are of dubious value in assessing student achievement. They will

have even less value as new kinds of learning outcomes are determined by externally referenced needs assessment (6) and incorporated into the curriculum.

Regarding the distinction between technological processes and technological applications. Now that we have reviewed these six basic conditions, let's come back to reanalyzing the relationship between technology as process versus technology as hardware applications. An examination of the contents of Table 1 (see pages 154-155) will facilitate this analysis.

As can be seen in Table 1, the problem solving and design processes are prerequisites to implementation of instruction regardless of whether the instructional procedures are hardware-based or not. If we attempt to approach educational problems systematically, it follows that the process side of educational technology will have its greatest relevance in identifying problems from needs (Step 1.0), in determining solution requirement and solution alternatives (Step 2.0), and in selecting solution strategies (Step 3.0) because there have been no known instances where hardware equipment has been able to accomplish these tasks. These steps can be best accomplished through the use of informed human judgment based on a rational determining of and analysis of values, resources, and desired outcomes.

As long as educational technology is equated with hardware applications such as television and computers, we are likely to begin our educational problem solving at Step 3.0 (select solution strategy). This is unfortunate because selection of instructional hardware in the absence of other important considerations such as knowing specifically what learners should be able to do that they presently can not do, is likely to fail because the hardware is a potentially useful solution being applied to the wrong problem!

Careful analysis of Table 1 shows that instructional hardware becomes relevant only after we reach Step 3.0 (select solution strategy) whereas technology as a problem solving and design process is evident in almost every facet of educational problem solving. It should be clear that the more generally useful facet of educational technology is inherent in the process side and is therefore a more strategic element in working out cost reduction procedures. We therefore urge the readers of this report to place greater reliance on technology as process rather than on technological hardware applications. By keeping these two facets in proper perspective we are much less likely to choose solutions to the wrong problems as has been true in the past.

Panaceas, technology, and reality. When one considers the conditions that have been identified above, it should be clear that there are no panaceas or easy solutions to be found in technology. Although educational technology provides concepts and tools that can help us to improve education, achieving this will require soul searching and contemplation of doing things in ways to which we are not accustomed. Educational technology will work for those who are committed to using rational processes

to achieve clearly identified, useful ends. Short of that kind of commitment, we may have to settle for whatever fate chooses to give us.

REFERENCES

1. Wingo, G.M. The educational scene today. Innovator, 6(11), 1975, 1;3. Ann Arbor: University of Michigan School of Education.
2. Boulding, K.E. The schooling industry as a possibly pathological section of the American economy. Review of Educational Research, 1972, 42(1), 129-143.
3. Pincus, J. Incentives for innovation in public schools. Review of Educational Research, 1974, 44(1), 113-144.
4. Drucker, P.M. Management: Tasks, responsibilities, practices. New York: Harper & Row, 1973.
5. Kaufman, R.A. Educational system planning. Englewood Cliffs, N.J.: Prentice-Hall, 1972.
6. Kaufman, R.A. Needs assessment: Internal and external. Paper presented at the meeting of the Association for Educational Communications and Technology, Miami Beach, April 1977.
7. Temkin, S., McCann, R., & Connolly, J. An assessment of the prospects for widespread school improvement. Educational Technology, 1977, 7(1), 7-12.
8. Hanushek, E. Learning by observing the performance of schools. In R.A. Wallhaus (Ed.), Measuring and increasing academic productivity: New directions for institutional research (No. 8). San Francisco: Jossey-Bass, Inc., 1975, 17-38.